Biodiversity Inventory of Alonsa Wildlife Management Area and Alonsa PFRA Community Pasture

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Technical Report 2000-05W
Wildlife Branch, Manitoba Conservation

Manitoba Conservation
Hon. Oscar Lathlin
Minister

Kowalchuk, M., L. Schaldemose and J. Sveinson. 2000. Biodiversity inventory of Alonsa Wildlife Management Area and Alonsa PFRA Community Pasture. Technical Report No. 2000-05W. Wildlife Branch, Manitoba Conservation, Winnipeg, Manitoba. 124 pp.

Executive Summary

Inventories of flora and fauna were performed in the Alonsa Wildlife Management Area (WMA) and Alonsa Community Pasture between June 6 and August 26, 1999. Both sites are located near Alonsa in western Manitoba. The inventories focused upon vascular plants and plant communities, birds, mammals, amphibians, reptiles, dragonflies and butterflies found in each of the major habitat types.

In the WMA, 8 vegetation transects were sampled in the 5 main habitat types identified: 1) treed bog; 2) trembling aspen woodland; 3) scrubby oak; 4) prairie ridge grassland; and 5) wetland. Animal sampling included three transects for birds, three for small mammals, and an assortment of sites for bats, amphibians, dragonflies and butterflies. Approximately 244 plant species and 115 animal species including 73 birds and 16 mammals were observed in the WMA.

In the Community Pasture, 43 plant transects were studied in 3 main habitat types: 1) woodland or forested; 2) grassland; and 3) wetland. Methods for vegetation sampling followed sampling protocols provided by Prairie Farm Rehabilitation Administration (PFRA), Agriculture and Agri-food Canada to facilitate production of a grazing management plan with the resultant data. Animal sampling included three transects for birds, three for small mammals, and an assortment of sites for bats, amphibians, dragonflies and butterflies. Approximately 205 plants and 92 animals including 73 birds and 7 mammals were observed in the Community Pasture.

Overall, 314 plant species and 141 animal species, including 98 birds and 17 mammals were observed in the two study areas.

Cover photographs:
Top Left: Alonsa Community Pasture, Field A2b. Grassland habitat in foreground, Trembling aspen woodland in background. Photo by Marilena Kowalchuk.
Top Right: Alonsa Wildlife Management Area, Treed bog habitat, forest floor species including Sphagnum and Hair cap mosses, Black spruce seedling and Twinflower. Photo by Marilena Kowalchuk.
Bottom Left: Alonsa Wildlife Management Area, Grassland habitat, Monarch butterfly feeding on Wild bergamot. Photo by Marilena Kowalchuk.
Bottom Left: Alonsa Wildlife Management Area, Oak Lake in foreground, open wetland, willows and treed bog habitats in background. Photo by Marilena Kowalchuk.

Acknowledgements

This project was made possible through funding provided by Prairie Farm Rehabilitation Administration (PFRA) of Agriculture and Agri-food Canada, the Canadian Wildlife Service (CWS) of Environment Canada, and the Habitat and Land Management Section of the Wildlife Branch, Manitoba Conservation (formerly Manitoba Natural Resources).

The Science Horizons Youth Internship Program in Environment Canada also provided funding enabling Marilena Kowalchuk to continue for an extended period and complete the writing of this document.

Project management and support were provided by Jason Greenall, Manitoba Conservation Data Centre, Wildlife Branch. The Manitoba Museum administered funds on behalf of the Manitoba Conservation Data Centre (CDC). The Manitoba Habitat Heritage Corporation also assisted with financial arrangements.

Direction and support regarding the PFRA portion of the project was provided by Bill Houston, Rangeland Conservationist, PFRA (SK).

Special thanks to Dan Chranowski and the Western Region of Manitoba Conservation for their support which included arranging an aerial tour of the study areas and providing use of a truck and an all-terrain vehicle.

The study participants would like to thank the following people for their support on this project: Harry Harris, District Manager, Alonsa Conservation District; Brant Kirychuk, Range Management Head, PFRA; Paul Lehn, Pasture Manager, and crew, PFRA, Alonsa; John Ledoux, Special Officer, Manitoba Conservation, Dauphin; Bob Simpson, owner, Dauphin Air Services; Jason Shepard, Fish and Wildlife Technician Assistant, Western Region; Jim Duncan, Wildlife Branch, Winnipeg; Ron Larche, Wildlife Branch, Winnipeg; François Blouin, Wildlife Branch, Winnipeg; Kurt Mazur, Wildlife Branch, Winnipeg; Peggy Westhorpe, Wildlife Branch, Winnipeg; Alan Wren, Manitoba Habitat Heritage Corporation, Winnipeg; Elizabeth Punter, Conservation Data Centre, Winnipeg; Dr. Bruce Ford, Curator, University of Manitoba Herbarium, Winnipeg; Fran Pettit and Troy Pettit, Amaranth.

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1. Introduction

Inventories of the biodiversity within the Alonsa Wildlife Management Area (WMA) and the Alonsa PFRA (Prairie Farm Rehabilitation Administration) Community Pasture were completed in 1999. Each of these areas provides a large block of wildlife habitat and considering that they are linked by the McCreary Community Pasture, the size of continuous habitat increases considerably. These areas are characterized by their ridge and swale topography, moderate to poorly developed Trembling aspen woodland and grassland ridges. The WMA also contains treed bog and scrubby oak habitat while the Community Pasture contains large expanses of previously cleared grassland. The primary uses of the two areas differ, but both of the areas are important for maintaining representative ecological communities.

The objective of this project was to document the flora and fauna occurring within the Wildlife Management Area and Community Pasture. The study provides data that are valuable to Manitoba Conservation for management of the WMA and to PFRA for development of management plans to ensure sustainable livestock grazing of the pasture.

The inventories were carried out between June 9 and August 27, 1999 with botanical studies by Marilena Kowalchuk and Julie Sveinson and zoological studies by Lisa Schaldemose. This report summarizes the findings of the inventories, and consists of an introduction, a description of the two study areas, a list of the methods used for each area and the results which include descriptions of the communities present and discussion. Included within the appendices are study summaries, including transect data and species lists, which are arranged first by study area and second by plant community type. Also, maps of transect sites are located within the appendices.

2. Study Area

Although the Alonsa WMA and the Alonsa Community Pasture are joined via the McCreary Community Pasture to form one continuous tract of land, their soil composition and land use are different, resulting in different habitat types being present. Therefore, they will be described separately.

2. 1. Alonsa Wildlife Management Area

2. 1. 1. Location and Ecology

The Alonsa Wildlife Management Area (WMA) is a 10917 hectare tract of land situated within Townships 22 and 23 of Range 13 WPM in the Local Government District (LGD) of Alonsa. The WMA is approximately 13 km northwest of Alonsa and 20 km east of McCreary (shortest distance). To travel from Alonsa to the main west access is approximately 60 km. Refer to Figure 1 and Figure 2 for maps showing boundary and detailed regional location. The WMA shares its south boundary with the McCreary Community Pasture. The main entrance access points are: 1) the southwest corner of 23 - 13W from Provincial Road 360; 2) the northwest corner of section 6-22-13W, west from PR 360 around Beaver Dam Lake; and 3) NE 16-23-

13W, northeast from PR 278 and Shergrove. Other access points are passable depending on moisture levels.

The WMA falls within the Lake Manitoba Plain ecoregion, within the Prairie ecozone (Ecological Stratification Working Group 1995). This ecoregion is characterized by its low relief underlain by limestone bedrock, covered by extremely calcareous, broadly ridged glacial till and a landscape mosaic of Trembling aspen and Bur oak groves and grasslands. Climatic conditions include a mean annual precipitation amounting between 450 - 700mm with a mean annual temperature of 2°C (16°C mean summer and -12.5°C winter). This ecoregion is transitional between the boreal forest and aspen parkland. The typical vegetation includes willows (*Salix* spp.) and sedges (*Carex* spp.) growing in poorly drained areas, Trembling aspen (*Populus tremuloides*) and shrubs growing in moist areas with Bur oak (*Quercus macrocarpa*) and grasses occupying drier areas.

A localized but substantial fire occurred in May 1998, the year prior to study, which influenced the landscape of the southwest central portion of the WMA. The fire occurred between SW 7-22-13 W and Tobacco Rock (Harris 1999, pers. comm.).

The main factors influencing the community types include soils, moisture levels and fire.

2. 1. 2. Physiography, Hydrology and Soils

Soils of the Wildlife Management Area are described by two surveys, Westlake (Ehrlich et al. 1958) which covers township 22, and Ste. Rose du Lac (Mills and Smith 1981) which covers township 23.

The dominant soil association for the WMA is the Isafold association. This association is characterized by a low ridge and swale topography, which runs in a northwest-southeast direction. The ridges are typically well drained with surface soil textures varying from fine sandy loam to loam. Runoff and permeability tends to be high in the upper, coarser layers. The ridges tend to support aspen woodland, wooded grassland and grassland community types. The ridges also tend to lie across landfall, posing a natural barrier to drainage. Poorer drainage typifies the swale areas and water tends to collect in depressed areas. Much of the area remains saturated for most of the year and some flooding conditions may occur in wet seasons. Some of the swales within the WMA contain organic deposits of varying thickness. The swale areas support moist to flooded grasslands (open wetland) and Black spruce/Tamarack woodland (bog).

Above normal precipitation in 1999 contributed to patchy flooding of areas within the WMA, and water levels in the area were exceptionally high for much of the study period. There are no manmade drainage systems within the WMA (Harris 1999, pers. comm.).

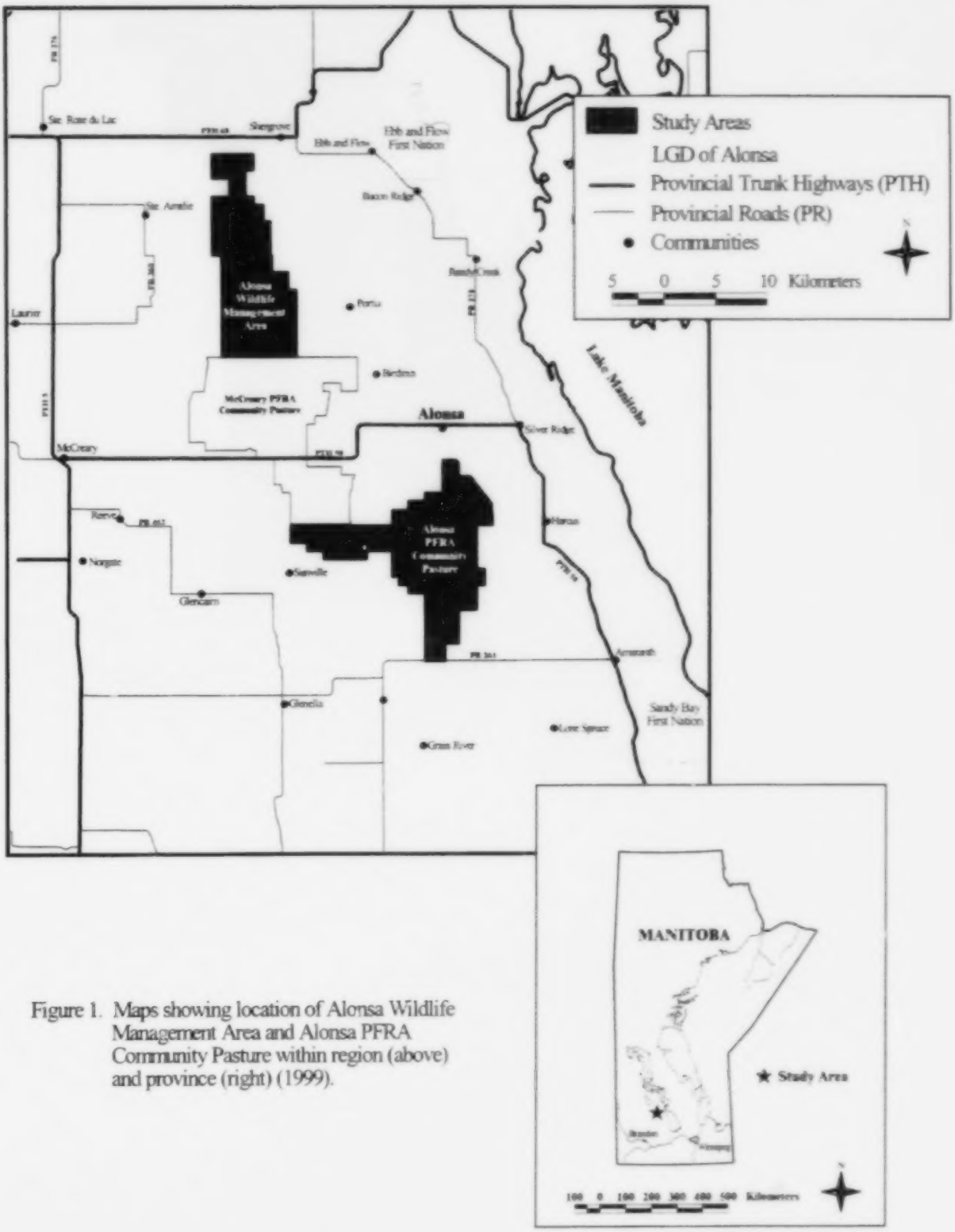

Figure 1. Maps showing location of Alonsa Wildlife Management Area and Alonsa PFRA Community Pasture within region (above) and province (right) (1999).

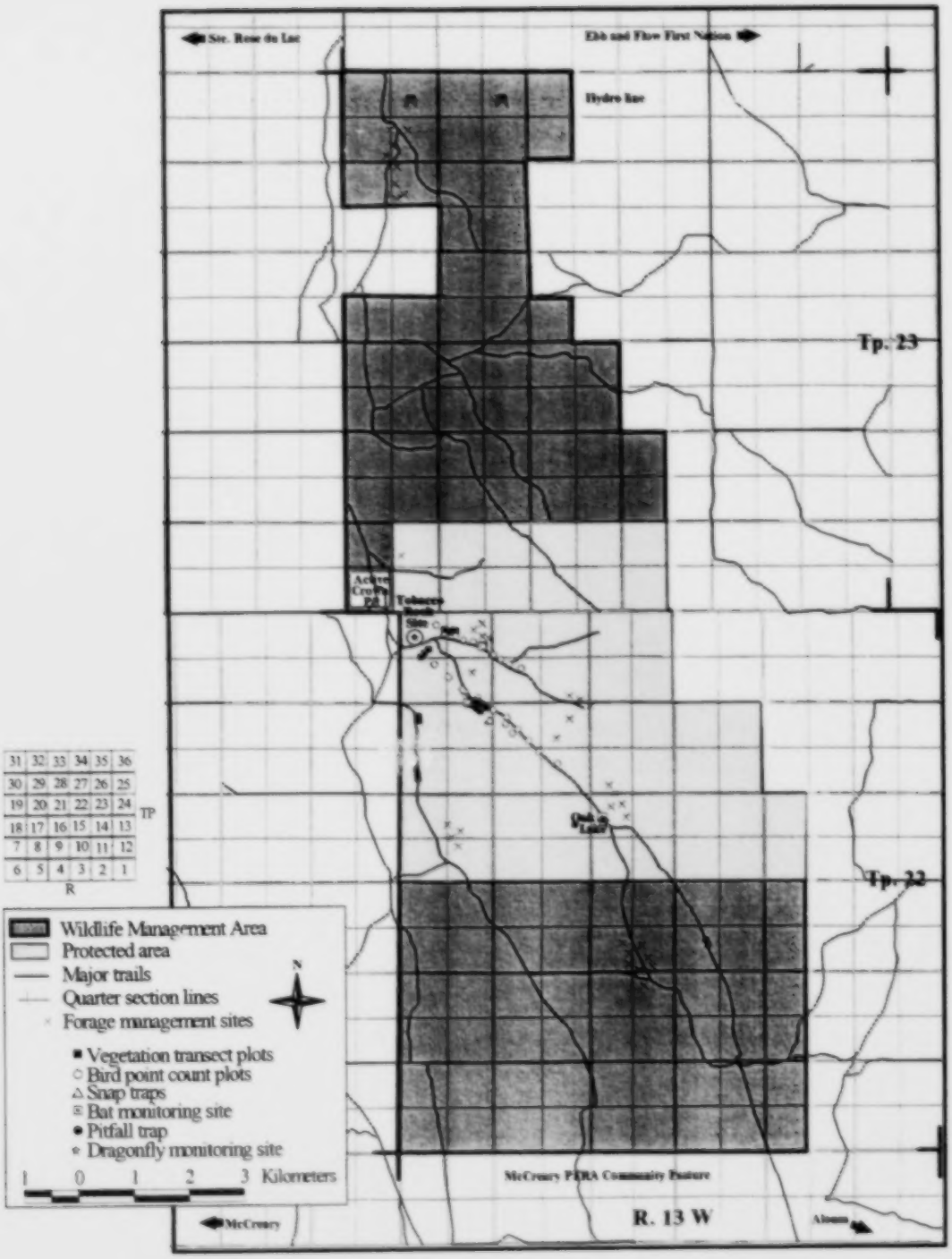

Figure 2. Map showing Alonsa Wildlife Management Area boundary, protected area, features and locations of transect sites (summer, 1999).

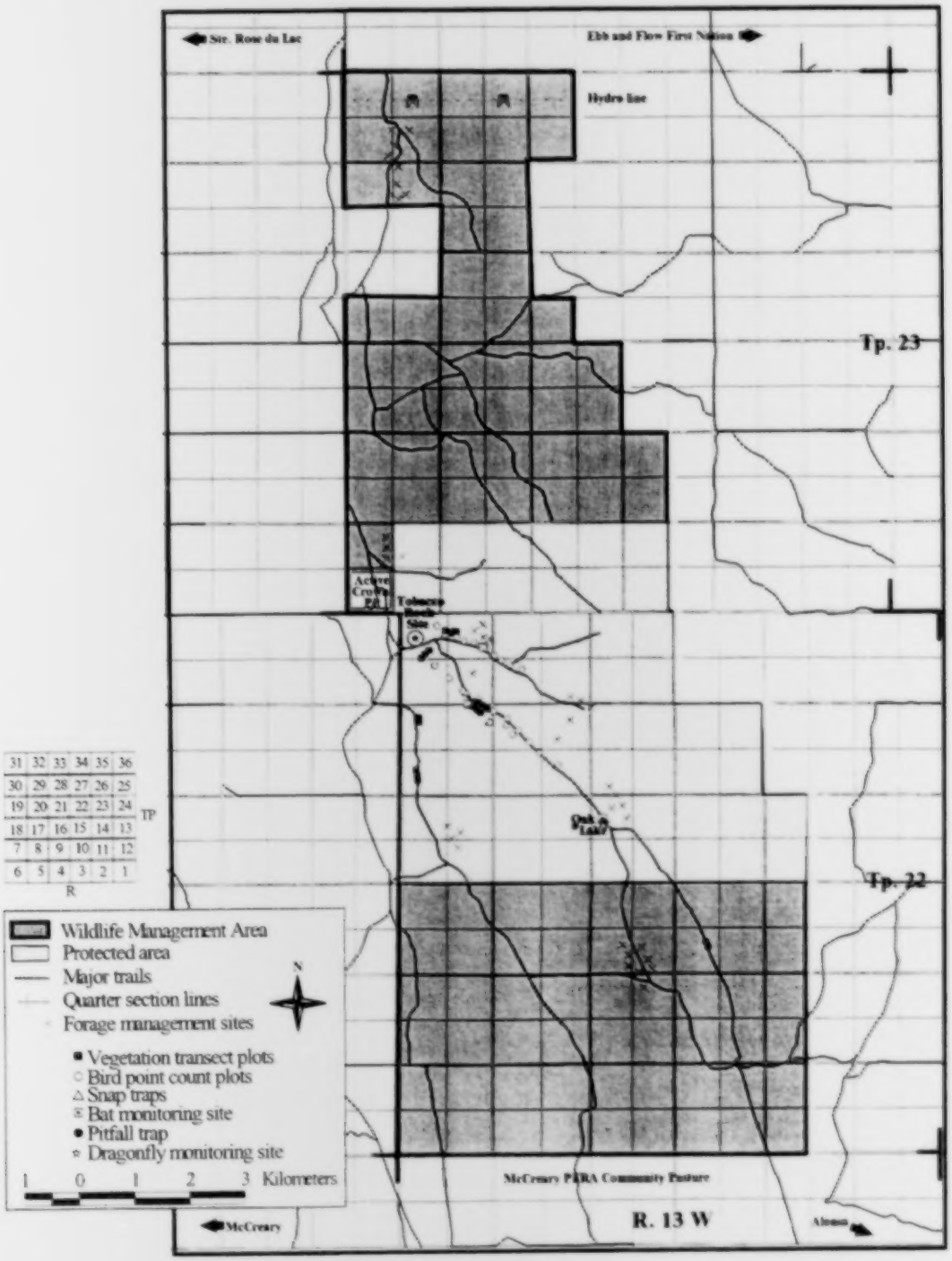

Figure 2. Map showing Alonsa Wildlife Management Area boundary, protected area, features and locations of transect sites (summer, 1999).

2. 1. 3. History, Use, and Management

The first use of the area by people of European descent was logging, beginning around 1900, with settlement following in 1916. Following poor agricultural success, many settlers left by late 1920's. Between 1930 and establishment of the WMA, the area was used agriculturally for grazing and haying of native grasslands (Davies 1983).

In 1961, temporary wildlife reservations were placed on the land included in the current WMA boundaries in response to land loss due to establishment of the McCreary Community Pasture. The area was eventually established as a Wildlife Management Area in 1974 (Davies 1983).

The main public use of the WMA is recreational and subsistence hunting. The main animals hunted are White-tailed deer and Sharp-tailed grouse, with hunting of Ruffed grouse increasing as their numbers increase. In addition, permits have been issued to outfitters for Black Bear hunting and baiting stations have been set up in the WMA. No trapping of fur-bearing animals is occurring in the WMA (Harris 1999, pers. comm.).

Since the establishment of the WMA, agricultural use of the area has been limited to haying of native grasslands. There are a number of hay permits issued and locations are concentrated on the main grassland ridges of the south-central portion of the WMA (Harris 1999, pers. comm.). No haying or hay equipment was observed during the study period. No commercial logging of the WMA has occurred recently. A number of public logging permits are issued by the Dauphin District office of Manitoba Conservation each year, mainly for Tamarack for use as posts (Harris 1999, pers. comm.).

An active crown gravel pit is located within SW 6-23-13W in the WMA and Annual Casual Permits are issued for this location. Refer to Figure 2 for location. Ste. Rose Sand and Gravel has been the main permit recipient (Harris 1999, pers. comm.). Total production reported between 1992 and 1998 was 33600 tonnes (Bennett 1999, pers. comm.).

An Aboriginal cultural site is located in NW 31-22-13W. This site contains Tobacco Rock and is of importance to the Ebb and Flow First Nation community, which is located east of the WMA. Management of the site began in 1997 and signs were put up in 1998 by the Miikenaa Centre, a youth home located a few miles west of the WMA. Oak Lake, a seasonal lake located in NW 21-22-13W, is an area of importance to the Sandy Bay First Nation community which is located southeast of the WMA (south of Amaranth). Refer to Figure 1 for locations of the communities and Figure 2 for locations of the cultural sites.

The WMA falls within the Alonsa Conservation District. The Conservation District performs locally based resource management and its primary role within the Alonsa WMA is recreational and educational, including trail maintenance, fire regulation and cultural site maintenance.

Applicable to all Wildlife Management Areas, the following activities are prohibited (Use of Wildlife Lands Regulation 77/99) without a permit: a) grading, gravelling or clearing a road or trail, b) installing or modifying a stream crossing, c) draining, dyking, or blocking a manmade or natural waterway or wetland, d) haying, grazing, clearing, bulldozing, burning, fencing, logging,

cultivation, mineral exploration or extraction, e) applying pesticides or f) construction, placing, occupying or using a building, structure or tent (except if the tent is temporary and removed when leaving WMA and used while engaging in lawful activities).

A portion of the WMA was given protected status under the regulation. The area consists of sections 19, 20, 21, 22, W ½ 23, 27, 28, 29, 30, 31, 32 and 33 in township 22-13W and sections 4, 5 and E ½ 6 in township 23-13W. Refer to Figure 2 for boundary locations. The following activities are prohibited in the protected area and permits will not be issued for a) hydroelectric exploration or development, b) logging or commercial forest harvesting, c) mineral exploration or harvesting, or d) any other activity that significantly and adversely affects habitat.

A network of trails was developed in the 1970's, following the main gravel ridges and running in a southeast/northwest direction (Davies 1983). The network contains roads and pathways with varying accessibility through the grasslands, woodlands and wetlands. More recently, the Alonsa Conservation District developed a 12.8 km trail known as Birdina Road on Crown Lease land and the WMA. It enters the WMA at the centre-east side and continues to the Tobacco Rock site (Harris 1999, pers. comm.). Refer to Figure 2 for main trail locations.

A forage development program was implemented in 1980 with the establishment of plots and dugouts throughout the WMA. Approximately 20 plots within aspen woodland were cleared, with rows of trees left standing, and seeded to alfalfa and oats (Davies 1983). Refer to Figure 2 for locations of forage plots.

2. 2. Alonsa Community Pasture

The Prairie Farm Rehabilitation Administration (PFRA) was established by an Act of Parliament in 1935. The original mandate of this administration was the rehabilitation of drought and soil drifting in the prairie provinces of Canada. The development of community pastures was primarily in response to widespread drought conditions, farm abandonment and land degradation but since then, the role of PFRA has grown to include many programs that promote rural and sustainable development (Agriculture and Agri-food Canada 1999).

2. 2. 1. Location and Ecology

The Alonsa Community Pasture is located within Townships 19 and 20 of Ranges 11 and 12W and Township 20 of Range 13W. It is located within the LGD of Alonsa, approximately 5 km south of Alonsa. Pasture headquarters are located at NW 14-20-12W. Refer to Figure 1 and Figure 3 for maps showing boundaries and detailed regional location. The Alonsa Community Pasture shares the westernmost portion of the north boundary with the McCreary Community Pasture.

Like the WMA, the pasture lies within the Lake Manitoba Plain ecoregion of the Prairie ecozone of Canada as outlined by the Ecological Stratification Working Group (1995). Refer to Section 2. 1. 1 above for characteristics of this ecoregion.

Approximately 64% of the total pasture area is classified as grassland, 20% is woodland and 15% is wetland (Bowes 1998). These estimates were derived from satellite images and some lighter woodland estimations may be lost in the grassland value.

2. 2. 2. Physiography, Hydrology and Soils

The Alonsa Community Pasture falls within the Westlake soil survey map area (Ehrlich et al. 1958). The main soil type within the community pasture is the Isafold association. The region is scattered with poorly drained, low-lying areas containing organic deposits. The surface soil textures are fine sandy loam to loam and surface stoniness tends to be severe. The topography is nearly level to gently sloping, forming a gentle ridge and swale relief pattern. This pattern, where the ridges tend to lie across the landfall, results in surface runoff collecting in the swales to form wetland areas. The ridges tend to be imperfectly drained due to slow surface runoff and internal drainage.

Two major drains, the Rocklan and Garrioch drains, were constructed within the pasture. They are class 3 drains flowing into the natural Garrioch creek, which flows directly into Lake Manitoba, north of Kinesota. The Alonsa Conservation district is responsible for management of these drains (Harris 1999, pers. comm.).

2. 2. 3. History, Use, and Management

The Alonsa Community Pasture came under PFRA management in 1976. This pasture falls within the Dauphin community pasture district. The pasture is 13165 ha in size with 174.3 km of fenceline enclosing 33 fields of varying sizes. Grazing numbers for 1999 were 2852 cattle and 57 horses with numbers projected for 2000 at 3100 cattle and 150 horses (Agriculture and Agri-food Canada 1999). Approximately 11% of the pasture has been cleared and seeded to tame forage species. A number of the smaller fields have been completely cleared and seeded, with partial clearing carried out on the other fields. The PFRA's land management practices for Alonsa include grazing and brush management.

Managed grazing is essential for the sustainability and long-term productivity of the pasture, but can also be used as a tool to reduce brush encroachment (Luciuk et al. 1999). A brush management plan for Alonsa is expected in March 2000. This plan will outline the management practices for Alonsa on a field by field basis. Brush management practices used by PFRA include chemical application, mechanical removal and prescribed burning (Houston 1999, pers. comm.). The majority of the fields within the community pasture have been burnt in the past with a portion having been burned more recently. Field A4 was burned in the spring of 1998.

There are no active gravel pits within the community pasture. No commercial logging is occurring within the community pasture. Management of water resources such as monitoring of drainage systems within the community pasture falls under the jurisdiction of the Alonsa Conservation District. A Ducks Unlimited water habitat management project is located in the southeast portion of the pasture, in fields A2 and A2c.

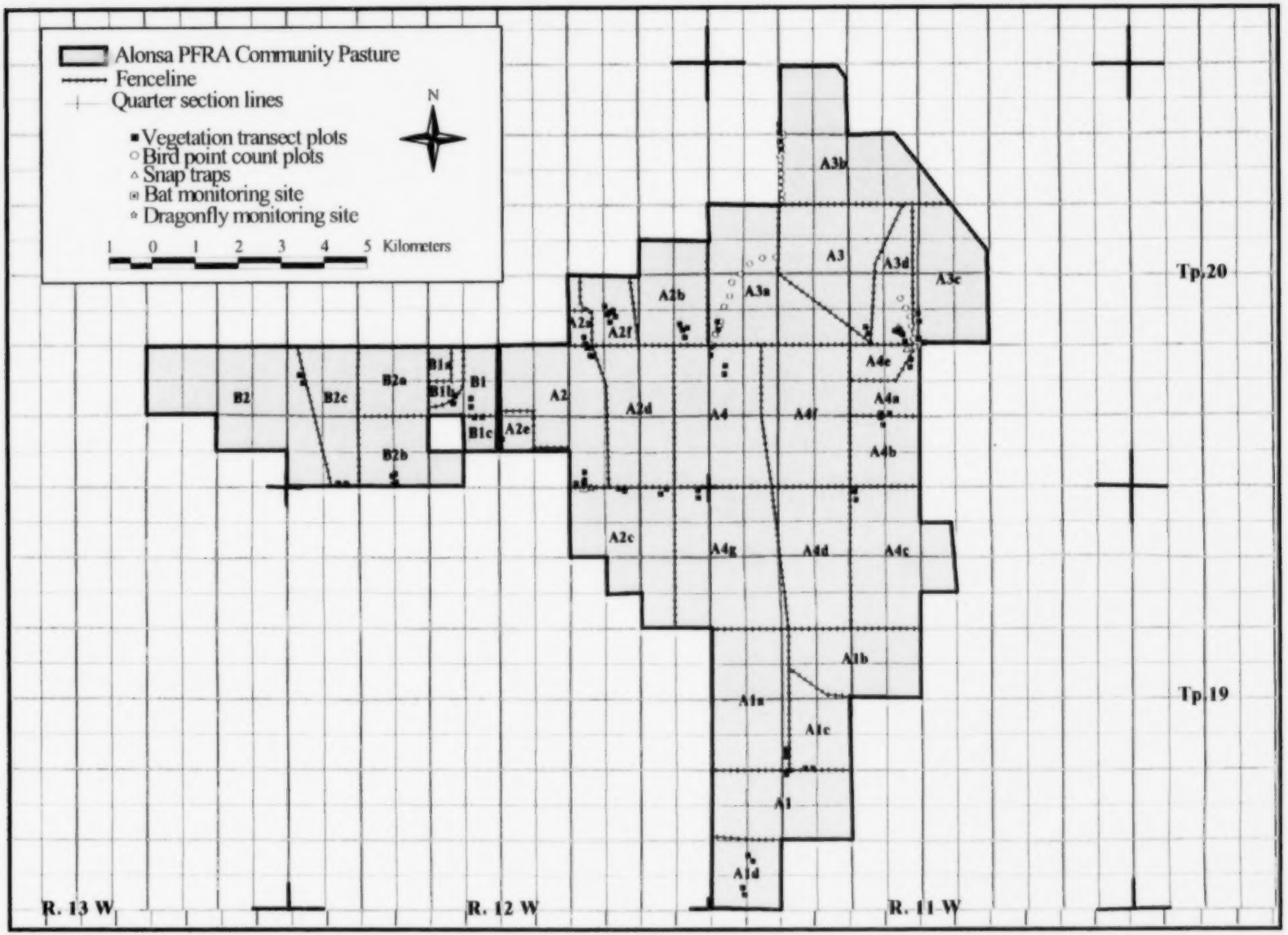

Figure 3. Map showing Alonsa PFRA Community Pasture boundaries, fencelines, field names and locations of transect sites (summer, 1999).

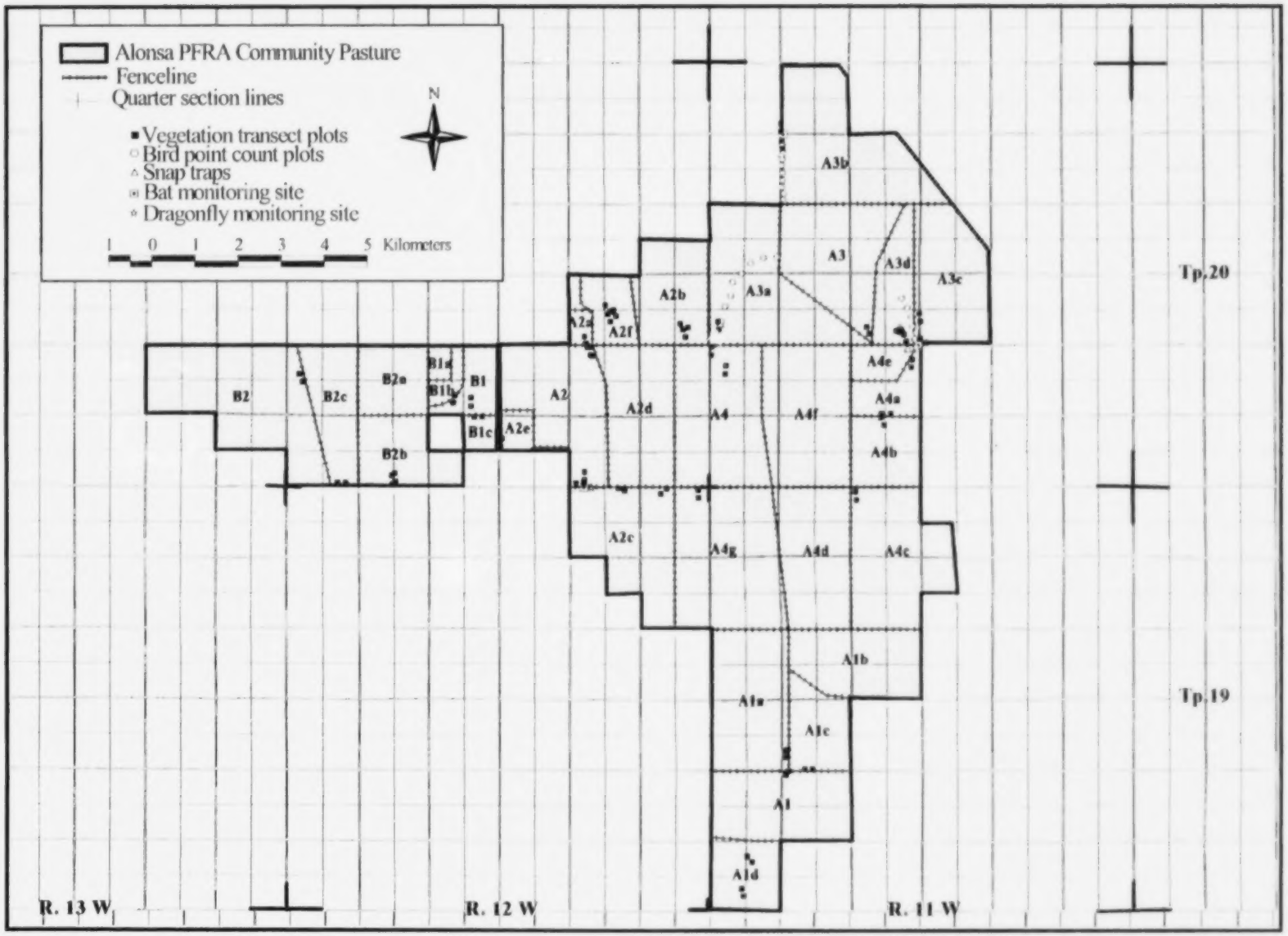

Figure 3. Map showing Alonsa PFRA Community Pasture boundaries, fencelines, field names and locations of transect sites (summer, 1999).

A cultural site is located in NW 1-20-13W and is in the process of being transferred from PFRA management to Alonsa Conservation District management. The area, which contains a medicine wheel rock formation, was designated as a cultural site by Provincial Order in Council and bulldozing for access and fenceline was set to occur in winter 1999 (Harris 1999, pers. comm.).

3. Methods

3. 1. Plants and Plant Communities

3. 1. 1. Alonsa Wildlife Management Area

The plant inventory was carried out between June 9 and August 26, 1999. Time spent in the WMA was broken down into: a) site exploration and selection; b) sampling; and c) observation and specimen collection.

a) Site selection

Site selection was based on information provided through all available maps, air photos, remote sensing imagery and/or the recommendation of knowledgeable individuals in addition to ground exploration. Study sites were chosen because they appeared to represent the major habitat types within the WMA. Locations used for animal sampling and site accessibility were also factors in determining sampling sites. A total of 8 transects were completed.

b) Sampling

Once a site was chosen, sampling was carried out using a transect method. A 10 m x 10 m sample plot was placed at 100 m intervals along a transect running through the specified habitat type. When possible, three such plots were sampled. All trees (woody species with circumference at breast height [CBH] > 15 cm) occurring in the plot were identified and their CBH's and estimated canopy cover were recorded in the tree data form. Shrubs (woody species > 1m in height, with CBH < 15 cm) were recorded within an inset 5 m x 5 m plot. All shrub species were identified and the number of stems of each species was recorded in the shrub data form. Five 1 m x 1 m quadrats randomly placed within the 10 m x 10 m plot were used to measure the ground stratum, including herbaceous species, shrubs < 1m in height, mosses and lichens. All species occurring in the quadrat were identified and their cover values estimated using the modified Daubenmire cover classes (0 = 0; 1 = 0-1%; 2 = 1-5%; 3 = 5-25%; 4 = 25-50%; 5 = 50-75%; 6 = 75-95%; 7 = 95-100%). Litter and bare ground cover values were included with the herb data. A site summary form was completed for all sites sampled; this is where pertinent information such as location and general site characteristics and appearance (apparent community structure, common species, soil characteristics, etc.) were recorded.

All data were tabulated and summaries for each habitat can be found in Appendices III to VII. Included here are summary tables showing mean circumference at breast height for tree species; mean cover, mean density and frequency for tree and tall shrub species and mean cover and frequency for herbaceous species. Refer to Appendix I for formulae used for calculations.

c) Observations

All plant species encountered in the WMA were recorded for occurrence and phenology. Voucher specimens were collected for verification and future identification. A specimen was not collected when local populations were very small (< 12 individuals). Specimens were deposited at the University of Manitoba herbarium. As many sites as possible were visited to determine species composition of each habitat type and the WMA as a whole. Identification was carried out using Scoggan (1957). Nomenclature follows Punter (1998).

3. 1. 2. Alonsa Community Pasture

Methods for the Community Pasture portion of the plant inventory were separate from those used in the WMA and were based on the PFRA inventory protocols for grassland pastures and for parkland and forested pastures. Sampling was carried out between July 1 and August 19, 1999. Time spent in the pasture was broken down into a) site selection; b) sampling; and c) observations.

a) Site selection

At PFRA's request, an attempt was made to sample each of the major habitat types (brush or woodland, grassland or wetland) in each field of the pasture. Based on information provided through all available maps, air photos, the field classification table (Bowes 1998) and/or the recommendation of knowledgeable individuals in addition to ground exploration, all habitat types warranting sampling within a site were identified. For this study, all habitat types covering greater than 25% of the total field area were to be sampled. Sampling was performed in areas which are representative, of livestock use and within 0.8 km of a stockwater source. A total of 43 transects were sampled in 28 of the 33 fields.

b) Sampling

All data were recorded using the PFRA range inventory data forms with herbaceous and woody species data in their respective sections of the forms only. Each habitat was sampled by placing a quadrat at 20 m intervals along a 200 m transect (10 quadrats total) with the GPS reading taken for each quadrat. Methods for grassland/wetland and woodland differed and were as follows:

i) Grassland and Wetland

For grassland and wetland transects, quadrat size was 20 cm x 50 cm. Values for estimated percent biomass of total for each herbaceous species constituting > 5% of the total biomass were recorded. Percent cover of total herbaceous cover, bare ground, clubmoss and litter were recorded using the modified Daubenmire cover classes (0 = 0; 1 = 0 - 1%; 2 = 1 - 5%; 3 = 5 - 25%; 4 = 25 - 50%; 5 = 50 - 75%; 6 = 75 - 95%; 7 = 95 - 100%). Refer to Appendix IX for summary of grassland data and Appendix X for wetland.

ii) Forested

For wooded transects, quadrat size was 50 cm x 50 cm. Using the modified Daubenmire cover classes, percent cover of each herbaceous species, total herbaceous cover, bare ground, litter (including leaf layer), moss and lichen, and clubmoss were recorded. Woody species cover was assessed within a 10 m wide belt running the full length of the transect (5 m on each side). Each woody species encountered along the transect was identified and recorded for its density

distribution class (see Appendix I), median height, height range and percent cover. Refer to Appendix VIII for summary of woodland data.

c) Observations

All species observed within the pasture were recorded and/or collected for occurrence and phenology, noting the field and habitat type they occurred in. Voucher specimens were collected for verification and future identification. Specimens were deposited at the University of Manitoba Herbarium. Notes were also made on livestock use patterns, unused or overused sites, poisonous plants, weediness, Crested wheat grass or Smooth brome invasion, plant vigour and/or clubmoss. Identification was carried out using Scoggan (1957). Nomenclature follows Punter (1998).

3. 2 Fauna

3. 2. 1 Alonsa Wildlife Management Area

The faunal inventory of the WMA was carried out between June 9 and August 26, 1999. The study involved: a) site selection; b) scientific sampling within the study sites to determine species composition (species richness) and relative densities (abundance) of birds and mammals, and to identify bats, amphibians, reptiles, dragonflies and butterflies in each of the habitat types; and c) observations.

a) Site selection

Sites which were representative of the major habitat types within the Alonsa WMA were selected for sampling. Habitat assessments for the WMA were based on topographic maps, aerial photography and aerial and ground surveys. Based on this assessment, three major habitat types were chosen for the focus of the animal portion of the WMA bioinventory. They were: 1) woodland; 2) grassland; and 3) wetland. Location of plant study sites and site accessibility were also factors influencing site selection.

b) Sampling

Faunal surveys involved use of several specific methods for each taxonomic group studied.

i) Point count surveys

Point count surveys were used to determine bird species composition and relative abundance. Methods for this survey followed Dale (1994). For grassland and wetland habitats, a circle of 100 m radius was used to account for the majority of bird species. For forested habitats, a circle of 25 - 50 m is required for species detection (Ralph et al. 1993). A point count survey was conducted in each of the three habitat types. Set-up within each habitat type consisted of 10 circular sites, with the centre of each not less than 250 m (150 m for woodland) apart. Two surveys were conducted at each site.

ii) Snap trapping

Snap trapping was used to determine species composition and relative abundance for small mammal species. Trapping transects were set up in each habitat type and sites were chosen based on location of point count survey sites. Set-up consisted of setting Museum Special snap traps along a transect using 10 m spacing between traps. Traps were baited using a peanut

butter-oatmeal mixture. For woodland sampling, 25 traps were used to account for the majority of small mammal species. For grassland, 50 traps were used. The trapping period consisted of three trap nights per habitat. For grassland and wetland, 50 traps x 3 nights is equal to 150 trap nights per habitat per area sampled. For woodland, 25 traps x 3 nights is equal to 75 trap nights. Specimens were removed from the traps, identified, and tossed back into the habitat, away from the transect site.

iii) Bat monitoring

Bat monitoring was conducted in each habitat type as outlined by Larche and Boychuk (1996). Monitoring took place for 45 minutes, beginning 30 minutes after dusk, using an *Anabat II* bat detector. Ultrasonic calls were taped and submitted to Manitoba Conservation for analysis.

iv) Pitfall trapping

Pitfall trapping was conducted for the determination of species composition and relative densities for small mammals and amphibians. One pitfall trapping array was set up as outlined by Call (1986). The configuration consisted of 3 pitfall traps (each consisting of two 1 kg coffee tins taped together), and 2 wire mesh drift fences (3.8 m long x 0.25 m high). Each trap was covered for a period of 10 days to allow desensitization of resident animals. After 10 days, each lid was raised to provide cover for the trapped animals. Traps were open and checked periodically throughout the sampling period and remained covered on non-sampling days. Specimens were removed from the trap, identified, and placed back into the habitat, away from the trap site.

v) Flip-boards

Flip-boards acted as moist, shady cover, which provided habitable environment for amphibians and reptiles. Flipping the board revealed the animals residing under them. For this study, a piece of cardboard or wood, about 1 m in length was placed in wetland habitat in each of two study areas. Flip-boards were checked regularly throughout the sampling period.

vi) Dragonfly monitoring

One 30 m dragonfly monitoring transect was set up in a site near wetland habitat (a temporary lake). The transect was checked periodically throughout the sampling period and data were collected in accordance with the pilot Manitoba Dragonfly Survey (Duncan 1999). Specimens were preserved and submitted to Manitoba Conservation for identification.

c) Observations

In addition to the preceding sampling methods, general observations were recorded. Mammal sightings, tracks and scat; bird observations and calls; and amphibian, reptile, dragonfly and butterfly observations were recorded incidentally throughout the area, over the course of the study period.

3. 2. 2. Alonsa Community Pasture

Sampling was carried out between July 1 and August 19, 1999. Methods outlined in Section 3. 2. 1 for the WMA were repeated for the Community Pasture with the following differences: 1) no pit-fall trapping was conducted and 2) flip-board sampling was conducted at one site only.

4. Results

The results of the studies have been categorized and arranged according to 1) study area and 2) habitat type.

4. 1. Alonsa Wildlife Management Area

The WMA was broken down into five main habitat types: 1) treed bog; 2) trembling aspen woodland; 3) scrubby oak; 4) prairie ridge grassland; and 5) wetland. Each habitat type was classified using a vegetation classification framework developed by the Manitoba Conservation Data Centre (Greenall 1996a, 1996b). Each of these habitat types are described below, along with a table summarizing data collected during this survey.

4. 1. 1. Treed Bog

The treed bog habitat type can be more formally classified as Black spruce-Tamarack/Labrador tea/Sphagnum woodland or *Picea mariana-Larix laricina/Ledum groenlandicum*/Sphagnum woodland. This habitat type occurred in low-lying areas with very poor drainage. Standing water was encountered through the entire study period and it is expected that, for many areas, it remains year-round. The material below the vegetation cover consists of a deep organic layer with a spongy appearance. The water level and thickness of organic layer varied with moisture levels.

The main tree species that occurred here were Black spruce (*Picea mariana*) and Tamarack (*Larix laricina*), which contributed to conifer needle content of the leaf litter. Standing dead and decaying fallen trees occurred. The tree canopy cover was up to 50%. The distribution of the trees was regular with a few gaps. Shrubs that occurred in the sample plot were Red-osier dogwood (*Cornus stolonifera*), Alder-leaved buckthorn (*Rhamnus alnifolia*), Honeysuckle (*Lonicera* spp.) and young White birch (*Betula papyrifera*). Shrub cover was sparse. In contrast, the ground layer was lush with high cover of moss and low-lying herbs. Disturbance levels appeared to be low but trails and removal of trees with chainsaws occurred at the more accessible sites. No non-native plant species were encountered at any Treed bog site visited.

No animal sampling occurred within this habitat type but some incidental observations were recorded. Rabbit and coyote droppings, a set of deer antlers, a wood frog and a tree frog were observed.

4. 1. 2. Trembling Aspen Woodland

Trembling aspen woodland habitat was the most common habitat in the WMA. This vegetation type occurred in low-lying areas, often adjacent to or grading into the lower lying wetlands and conifer woodland or the drier scrubby and grassland areas. Drainage appeared to be good to moderately poor. The woodland transect followed a ridge with an obvious gradient at the edge. There did not appear to be many occurrences of mature aspen woodland in the WMA, likely due to poor soil and moisture conditions.

Two transects were sampled in this habitat type, one in a relatively mature stand (Table 2 (a)), the other in a stand burned one year before the study (Table 2(b)).

Table 1. Summary of Treed Bog habitat type, Alonsa Wildlife Management Area.

TREED BOG
Transect 4; Alonsa WMA; July 7, 1999.
Location
NE 20-22-13W
Description
Conifer dominated; located in low-lying, poorly drained swale areas lying in a northeast/southwest direction; high, but varying moisture levels, as most sites visited contained standing water or saturated soil throughout study period. Deep surface organic layer; leaf litter mainly of conifer needles; very high amounts of moss at transect site.
Trees
2 species recorded in plot, Black spruce and Tamarack; canopy cover <50%. Other species observed were *Betula papyrifera*, *Populus tremuloides*, *Picea glauca*.
Tall Shrubs
4 species encountered in plot, Red-osier dogwood (*Cornus stolonifera*), Swamp-fly-honeysuckle (*Lonicera oblongifolia*), White birch (*Betula papyrifera*) and Alder-leaved buckthorn (*Rhamnus alnifolia*); sparse to moderate tall shrub layer.
Herbs and Low Shrubs
32 species recorded in plot; 57 plant species in total recorded for habitat type. Rich herb layer with high cover values for species with matted growth like Small cranberry (*Vaccinium oxycoccos*), Twinflower (*Linnaea borealis*) and Mitrewort (*Mitella nuda*). Also, high moss cover values in ground layer.
Birds
No bird data available for this habitat type.
Mammals
Rabbit scat in plots (species not identified); White tailed deer antlers found near plot site.
Amphibians and Reptiles
Wood frog and Tree frog observed near plot site.
Invertebrates
Common wood nymph observed.
Comments
1 plot with 8 quadrats sampled; sites with some trees removed but otherwise low disturbance.
For more information
Refer to Figure 6 (Appendix XI) and Appendix III of this report.

Trembling aspen was the main tree species along with some Bur oak (*Quercus macrocarpa*) in the drier portions of the woodland and patches of Balsam poplar (*Populus balsamifera*) in wetter areas. Trembling aspen trees were tall but the canopy rarely touched. Tree canopy cover was about 40% in the plots sampled. There were some dead standing aspen individuals. A single American elm (*Ulmus americana*) and one Green ash (*Fraxinus pennsylvanica*) were encountered in this habitat type.

Most of the Aspen woodland encountered in the WMA had a dense shrub layer with Beaked hazelnut (*Corylus cornuta*) found in well drained areas and Red-osier dogwood (*Cornus stolonifera*) and willow (*Salix* sp.) found in more poorly drained areas. The highest shrub cover and number of shrub species occurred in this habitat type. Cover of Beaked hazelnut was as high as 80%.

The herb layer had relatively low cover values likely due to dense shrub cover. The main disturbance would have been from cutting of trails and vehicular travel on those trails. Most exotic species observed in the woodland were adjacent to trails.

A vegetation transect was carried out in a portion of Aspen woodland that burned in the spring of the previous year (Table 2 (b)). It appeared that the woodland was likely at an earlier stage of development than the unburned area where a transect was run. As expected with a burn of some intensity, there were many differences between burnt and non-burnt woodland. One living Balsam poplar (*Populus balsamifera*) occurred with many dead young standing Trembling aspen within the transect. There was virtually no canopy cover. Some living Bur oak trees occurred throughout the burned area but were not recorded in the transect.

A dense shrubby regrowth of Trembling aspen suckers is now characteristic of the burned area. The herb layer was very sparse (due to dense shrub cover) and many of the species were non-native or indicative of disturbance. The litter layer was composed of primarily Trembling aspen leaves and values were moderate. Bare ground values were moderate. No animal data were collected for the burned woodland.

Animal sampling, including a bird point-count survey, small mammal trapping and bat monitoring were carried out in association with the vegetation transect in the Trembling aspen woodland. Most of the bird species detected in the point count survey were typical of woodland habitat in the region, although Wood thrush observations are outside this species' expected range, and should be confirmed. Species associated with interior and edge habitat were both represented. Common species encountered included Hairy woodpecker, Red-eyed vireo, American redstart, Veery, Rose-breasted grosbeak and White-throated sparrow. A total of 28 species were detected during the point count survey. A total of 40 bird species were recorded for the Aspen woodland habitat in the WMA. This was the habitat and transect with the highest number of bird species for the WMA.

Small mammal sampling using snap traps documented one Deer mouse and 3 Southern red-backed voles. Bat data were unavailable at time of completion of this report. Other mammals were recorded in the Aspen woodland habitat type including White-tailed deer, White-tailed jackrabbit, Eastern chipmunk, Richardson's ground squirrel and Thirteen-lined ground squirrel. Coyote and Elk scat or tracks were also observed.

Gray tree frog was the only amphibian species recorded for Aspen woodland. Butterfly species occurrences included Peck's skipper, Pepper and salt skipper, Great spangled fritillary, Gorgone checkerspot, Silvery checkerspot, Ringlet and Common wood nymph.

Table 2 (a). Summary of Trembling aspen woodland habitat type, Alonsa Wildlife Management Area.

TREMBLING ASPEN WOODLAND
Transect 3; Alonsa WMA; June 24, 1999.
Location
NE 21-2-13W; UTM: 14U 0481472 E, 5643813 N
Description
Mainly Trembling aspen (*Populus tremuloides*) individuals with canopy rarely touching; dense shrub layer; occurring in lower lying areas; varying moisture conditions. Litter and bare ground cover values were moderate.
Trees
2 tree species, Trembling aspen (*Populus tremuloides*) and a willow (*Salix* sp.), encountered along transect; canopy cover < 40%, rarely touching. Observation of occasional Bur oak (*Quercus macrocarpa*) individuals in dry areas and Balsam poplar (*P. balsamifera*) in moist areas.
Tall Shrubs
13 species encountered along transect; 19 shrub species recorded in total. Common shrub species included Beaked hazelnut (*Corylus cornuta*), Saskatoon (*Amelanchier alnifolia*) and Red-osier dogwood (*Cornus stolonifera*).
Herbs and Low Shrubs
42 species encountered along transect; 70 plant species observed throughout. Common herbaceous species included Wild sarsaparilla (*Aralia nudicaulis*), White-grained mountain rice grass (*Oryzopsis asperifolia*), Poison ivy (*Rhus radicans*), Two-leaved Solomon's seal (*Maianthemum canadense*) and Smooth wild strawberry (*Fragaria virginiana*).
Birds
28 bird species encountered during point count survey; 40 bird species recorded for habitat. Common species included Red-eyed vireo, Hairy woodpecker, Rose-breasted grosbeak and American redstart.
Mammals
2 species, deer mouse and Southern red-backed vole, encountered during snap trapping; 9 species recorded for woodland, including White-tailed deer, Richardson's ground squirrel and Eastern chipmunk; bat data unavailable at time of writing.
Amphibians and Reptiles
Gray tree frog observed.
Invertebrates
7 butterfly species observed.
Comments
Most common habitat type encountered in WMA; 1 occurrence each of Green ash (*Fraxinus pennsylvanica*) and American elm (*Ulmus americana*) observed; low number of exotic species.
For more information
Refer to Figure 4 (Appendix XI) and Appendix IV of this report.

Table 2(b). Summary of Burned Trembling aspen woodland habitat type, Alonsa Wildlife Management Area.

BURNED TREMBLING ASPEN WOODLAND
Transect 7 (2 plots); Alonsa WMA; July 21, 1999.
Location
NW 30-22-13W; UTM not available.
Description
This transect was carried out within the portion of the WMA that burned in 1998. It appeared to kill most of the Trembling aspen (*Populus tremuloides*) individuals. A dense shrubby regrowth of Aspen and Hazelnut (*Corylus* sp.) with a sparse herb layer has developed since. There were few living mature Aspen and Bur oak (*Quercus macrocarpa*); many standing dead trees.
Trees
Only 1species, Balsam poplar (*Populus balsamifera*), was recorded in plot 2 with canopy cover <10%.
Tall shrubs
7 shrub species encountered. Dense shrub growth with high stem density and cover values. The most abundant shrub story component was from suckering growth of Trembling aspen (*Populus tremuloides*). Other abundant species included Hazelnut (*Corylus* sp.) and Chokecherry (*Prunus virginiana*).
Herbs and low shrubs
29 species encountered; low ground cover values. Common species included Wild sarsaparilla (*Aralia nudicaulis*), Saskatoon (*Amelanchier alnifolia*), Two-leaved Solomon's-seal (*Maianthemum canadense*), Pale vetchling (*Lathyrus ochreleucus*) and Bicknell's geranium (*Geranium bicknellii*).
Birds, Mammals, Amphibians and Reptiles, Invertebrates
No animal data available for this habitat type.
Comments
Charred dead standing trees; demonstrating attributes of a disturbed site as indicated by growth of aspen suckers and ground cover species present.
For more information
Refer to Figure 5 (Appendix XI) and Appendix IV.

4. 1. 3. Scrubby Oak

The scrubby oak habitat occurred along well-drained ridges, where the soil is sandy and rocky beneath, and was characterized by the occurrence of relatively low-statured Bur oak (*Q. macrocarpa*) trees in an open sparse stand. The oak canopy was not touching and cover was less than 25%. The Bur oaks, along with one Trembling aspen (*P. tremuloides*), were the only trees encountered. The vegetation also consisted of low shrubs, tall forbs and often a mat of bearberry (*Arctostaphylos uva-ursi*). Shrub cover was sparse and consisted of small oaks and Chokecherry (*Prunus virginiana*). Cover of low shrubs and herbaceous species was high. This habitat type was usually bordered and interspersed with patches of grassland and aspen woodland. Litter levels were moderate and surface soil layer was shallow. The transect site was likely subjected to the burn in 1998.

No animal data were collected in this habitat type.

Table 3. Summary of Scrubby Oak habitat type, Alonsa Wildlife Management Area.

SCRUBBY OAK
Transect 2; Alonsa WMA; June 16, 1999.
Location
NW 31-22-13W; UTM: 14U 0480997 E, 5643427 N
Description
Open stands of relatively small-statured Bur oak trees with grasses, forbs and low shrubs occurring along sand/gravel ridges; interspersed with patches of grassland and Aspen woodland. Moderate litter levels, shallow layer of topsoil but high amounts of roots and rhizomes.
Trees
2 species, Bur oak and Trembling aspen; canopy cover < 25%.
Tall Shrubs
2 species, Bur Oak and Chokecherry, few individuals and low cover values.
Herbs and Low Shrubs
40 species encountered along transect; 53 plant species in total recorded for scrubby oak habitat. Common species in the herb and low shrub layer included Saskatoon (*Amelanchier alnifolia*), Northern bedstraw (*Galium boreale*), Bluegrass (*Poa* sp.), Snowberry (*Symphoricarpos* sp.), Bearberry (*Arctostaphylos uva-ursi*), and vetch (*Lathyrus* sp.).
Birds, Mammals, Amphibians and Reptiles, and Invertebrates
No animal data available for this habitat type.
Comments
Transect location may have been subject to burn 1998.
For more information
Refer to Figure 4 (Appendix XI) and Appendix V of this report.

4. 1. 4. Prairie Ridge Grassland

The main grassland type occurring in the Alonsa WMA was dominated by a number of grasses, including Porcupine grass (*Stipa spartea*), bluegrass (*Poa* sp.), and others. In the WMA, this community type tended to occur along the crest of the ridges with well-drained sandy soil. Most of the grassland areas observed were bordered by stands of young to mid-maturity Trembling aspen. The width of the grassland, i.e. distance between Aspen woodlands, varied. No trees were encountered in the transects, or in the grasslands in general. A few clumps of Hazelnut (*Corylus* sp.) shrubs occurred at the transect site but were not recorded within it. Two transects were sampled in grassland habitats (Table 4(a)). Transect 1 had a low cover of litter and relatively high bare ground cover but higher litter levels were observed in other areas with similar community structure. Transect 8, containing two plots, was sampled in a less accessible area of smaller size. The species encountered there were similar to Transect 1.

Use of this habitat included occasional hay permits (no haying was observed during the study period), hunting, camping and other cultural and recreational activities. A well-used vehicle roadway ran along most of the ridge which increased the levels of disturbance; areas with high amounts of sweet clover (*Melilotus* sp.) and other weedy species such as Silvery cinquefoil (*Potentilla argentea*) and Smooth brome (*Bromus inermis*) were primarily observed adjacent to the roadway.

Table 4 (a). Summary of Prairie ridge grassland habitat type, Alonsa Wildlife Management Area.

PRAIRIE RIDGE GRASSLAND
Transect 1; June 14, 1999; Transect 8; July 19, 1999; Alonsa WMA
Location
1) NE 30-22-13W; UTM: 14U 0482017 E, 5642497 N; 8) SW 15-22-13W; UTM: 14U 0486089 E, 5638065 N
Description
This community type occurs on the top of ridges with well-drained sandy soils. Often, it is bordered by young to mid-maturity encroaching trembling aspen. Litter levels low to moderate. Dominant species included *Stipa* sp., and *Poa* sp.
Trees
No trees encountered along transects.
Tall Shrubs
No tall shrubs encountered along transects.
Herbs and Low Shrubs
62 species encountered along transects; 128 plant species in total observed in grassland. Common herbs included *Poa* sp., *Koeleria cristata*, *Danthonia spicata*, *Stipa* sp., *Comandra umbellata*, *Galium boreale*, *Erigeron* spp., *Prunus pumila*, *Achillea millefolium*, *and Sisyrinchium montanum*.
Birds
17 species encountered along transect; 17 bird species in total observed in grassland. Common bird species included Savannah sparrow, Eastern kingbird, Clay-coloured sparrow, Mourning dove, Song sparrow. 1 Savannah sparrow caught in snap trap.
Mammals
No mammals found in snap traps; 1 species found in pitfall trap: Masked shrew; bat data unavailable; 7 species total observed in grassland including Coyote, White-tailed deer, White-tailed jackrabbit and Thirteen-lined ground squirrel.
Amphibians and Reptiles
Wood frog and Western plains garter snake observed
Invertebrates
5 species of dragonfly and 8 species butterfly observed
Comments
Grassland areas may be subject to hay permits; increased disturbance levels due to trail roads along ridges with relatively high amounts of weedy species such as Sweet clover or Brome grass occurring adjacent to roadway.
For more information
Refer to Figure 5 (Appendix XI; no Figure available for transect 8) and Appendix VI of this report.

Animal sampling for the Grassland habitat type included a bird point-count survey, small mammal trapping, bat monitoring, pitfall trapping and dragonfly surveying. The bird point count transect was located in the same grassland as the vegetation transect. At some points, the bird survey transect was in close proximity to shrub, woodland and wetland habitat. In addition to the species typical of grassland habitat, a high number of species that are typical of other habitat types were recorded. Typical grassland species that were recorded in relatively high abundance were Savannah sparrow, Clay-coloured sparrow, Song sparrow and Vesper sparrow. Other species more characteristic of wooded or shrubby habitats that were also recorded in relatively high abundance were Eastern kingbird, Mourning dove and American crow.

No mammal species were recorded using snap traps, although one Savannah sparrow was caught after trap night 1. Bat data was unavailable at time of completion of this report. Pitfall trapping detected one Masked shrew. A number of mammal species were observed for the grassland habitat type including White-tailed deer, White-tailed jackrabbit, Eastern cottontail, Franklin's ground squirrel and Thirteen-lined ground squirrel. Evidence of Coyote and Striped skunk was observed. Wood frog was the solitary amphibian species observed. Western plains garter snake was frequently observed.

Invertebrate species observed included eight butterfly species (Dreamy dusky wing, Tiger swallowtail, Common sulphur, Western tailed blue, Northwestern fritillary, Ringlet, Viceroy and Monarch) and five dragonfly species (Canada darner, Green darner, Dot-tailed whiteface, Four-spotted skimmer, and Variegated meadowhawk).

A portion of the west edge of the WMA was subject to a burn in 1998. A grassland vegetation transect was also conducted at a location within the burn area (Table 4 (b)). The fire appears to have contributed to a vigorous reestablishment of a variety of prairie species. The burned and unburned grasslands showed more similarities to each other than the burned and unburned woodlands.

Table 4 (b). Summary of Burned prairie ridge grassland habitat type, Alonsa Wildlife Management Area.

BURNED PRAIRIE RIDGE GRASSLAND
Transect 6; Alonsa WMA; August 11, 1999
Location
SW 30-22-13W; UTM: 14U 0480861 E, 5641222 N
Description
A transect was carried out within a grassland in the portion of the WMA that burned in 1998. Similar characteristics to grassland in Table 4 (a).
Trees
No trees encountered along transect.
Tall shrubs
No tall shrubs encountered along transect.
Herbs and low shrubs
55 species encountered along transect; 60 species total recorded for burned grassland. Common species included *Poa pratensis* and *Andropogon scoparius*, *A. gerardii*, *Stipa* sp., *Campanula rotundifolia*
Birds
Sandhill cranes observed.
Mammals
Cluster of burrows observed within vegetation transects plot.
Amphibians and Reptiles, Invertebrates
No data available for this habitat type.
Comments
Appeared to be a vigorous re-establishment of prairie species. Transect site appeared to contain low abundance of exotic species. Other burned areas outside of transect contained more growth of species such as Black bindweed (*Polygonum convolvulus*) and Evening primrose *(Oenothera biennis*).
For more information
Refer to Figure 6 (Appendix XI) and Appendix VI.

No animal sampling was carried out in the burned grassland but numerous burrows occurred in one vegetation plot and 2 Sandhill cranes were observed.

4. 1. 5. Wetland

The wetland vegetation type sampled in the Alonsa WMA occurred in poorly drained, low-lying areas. Standing water occurred throughout the study period and it is expected to be so during most years. The wetland was predominantly sedges (*Carex* spp.) and bulrushes (*Scirpus* spp.), but other wetland grasses like Reed canary grass (*Phalaris arundinacea*) and marsh reed grass (*Calamagrostis canadensis*) surrounded it. Bulrushes were more abundant towards the centre of the wetland site. Stands of Common reed (*Phragmites australis*) and Sandbar willow (*Salix exigua*) were also common. No trees occurred in the vegetation transect and none were observed elsewhere in this habitat. The mosaic of microhabitats influenced by varying moisture levels was particularly visible in this habitat type.

Table 5. Summary of Wetland habitat type, Alonsa Wildlife Management Area.

WETLAND
Transect 5; Alonsa WMA; August 10, 1999.
Location
NE 30-22-13 W; UTM: 14U 0481925 E, 5642414 N
Description
Poorly drained areas dominated by *Carex* sp. and *Scirpus* sp.; peripheral growth of wetland grasses including *Phalaris arundinacea* and *Calamagrostis* sp.; stands of *Phragmites australis* occurring.
Trees
No tree species encountered along transect.
Tall Shrubs
1 species, *Salix exigua*, encountered along transect.
Herbs and Low Shrubs
25 species encountered along transect; 57 plant species total observed in open wetland habitat. Common species included sedges (*Carex* sp.), Woundwort (*Stachys palustris*), Smartweed (*Polygonum* sp.), Common water-plantain (*Alisma plantago-aquatica*), Reed canary grass (*Phalaris arundinacea*) and Common reed (*Phragmites australis*).
Birds
25 species encountered during point count survey, 1 in snap traps. 33 species total recorded for wetland. Common species included Cedar waxwing, Eastern kingbird, Mallard, Sedge wren and Marsh wren.
Mammals
Five species encountered in snap traps; 8 mammal species recorded for wetland. Common species included Deer mouse, Masked shrew and Southern red-backed vole. Bat data unavailable at time of writing.
Amphibians and Reptiles
Boreal chorus frog, Wood Frog and Western plains garter snake observed.
Invertebrates
4 dragonfly species and 3 butterfly species recorded.
Comments
Transects carried out at edge of wetland.
For more information
Refer to Figure 5 (Appendix XI) and Appendix VII of this report.

The transect was located along the edge of the wetland. The herbaceous cover was mainly by sedges and wetland grasses. There were some wetland forb species such as Woundwort (*Stachys palustris*), Smartweed (*Polygonum* sp.) and Common water-plantain (*Alisma plantago-aquatica*) and aquatic species such as Pondweed (*Potamogeton* sp.) present. One plot was located partially on a dry slope where upland species such as Rose (*Rosa* sp.) were recorded. The main use of the area is for hunting and a vehicle trail leads to it.

Animal sampling carried out in the open wetland included a bird point-count survey, small-mammal trapping and bat monitoring. The bird point count survey was at the same location as the vegetation transect. A total of 25 bird species were recorded during the point count survey, although many of these were not typical of wetland habitat. This was likely due to the close proximity of woodland, shrub and grassland habitats to the transect site. The common species encountered typical of wetland habitat include Mallard, Marsh wren and Sedge wren. Species typical of other habitats include Cedar waxwing, Eastern kingbird and Song sparrow. A total of 33 bird species were recorded for the wetland habitat type in the WMA. One Marsh wren was caught during snap trapping.

A total of five mammal species were recorded using the snap trap sampling method. Six Deer mice and two Southern red-backed voles, one Masked shrew, one Least chipmunk and one Thirteen-lined ground squirrel were documented. Bat data were unavailable at time of completion of this report. A total of eight mammal species were recorded for the wetland habitat type in the WMA. Species observed included Muskrat and White-tailed deer. Evidence of Coyote and Moose was also observed.

Amphibian species recorded were Boreal chorus frog and Wood frog. Western plains garter snake was also observed frequently. Invertebrate occurrences included dragonfly species Canada darner, Red-veined meadowhawk, White-faced meadowhawk and Ruby meadowhawk. Butterfly species included Great spangled fritillary, Northwestern fritillary and Common wood nymph.

4. 2. Alonsa Community Pasture

Due to the requirements of the PFRA vegetation inventory protocol, the community pasture was broken down into three main habitat types: grassland, woodland (forested) and wetland. Numerous sites were sampled, particularly for grassland, requiring that summary tables summarize multiple transects.

4. 2. 1. Woodland (Forested)

Woodland sites from 13 fields were sampled. A total of 103 plant species were recorded for woodland habitat. The dominant tree species was Trembling aspen (*Populus tremuloides*). Pasture woodland sites tended to have open canopy, with a sparse tall shrub layer and a sparse herb layer. No Bur oak (*Quercus macrocarpa*) of tree size were encountered along any woodland transect but some of shrub size were. An occasional oak tree was observed, usually along the road or within a grassland. No conifer species were encountered within the pasture. Cattle trails were evident in all pasture woodlands visited.

Woodlands in the pasture differed from those in the WMA with respect to features such as shrub layer, species richness and bare ground cover values. While certain vegetation features produced under grazing conditions, such as a sparse shrub layer, characterize the pasture woodland (versus non-agriculturally grazed woodland), there was considerable variation within pasture woodland sites. The woodland habitat type has been broken down into two broad categories based on their apparent stage of development: i) mature; and ii) immature.

i) mature woodland

The transect sites that were categorized as mature were in fields A2, A2b, A2f, A3b, B2 and B2b. Generally, these woodland sites contained larger trees and a more pronounced tall shrub layer. Bur oak could be found in drier sites; Balsam poplar (*P. balsamifera*) could be found in moister sites. The herb layer was more species-rich and had higher cover than the immature type.

Table 6 (a). Summary of Mature woodland habitat type, Alonsa Community Pasture.

MATURE WOODLAND
Transects A2, A2b, A2f, A3b, B2, B2b
Location
Multiple; See Figure 3 for general locations and Appendix II for locations and dates.
Description
Woodland of mainly mid-aged Trembling aspen (*P. tremuloides*); canopy not closed; tall shrub layer sparse but more pronounced than in immature woodland.
Woody Species
Trees tended to be larger than within immature woodland; typical species included Trembling aspen, Hazels, Saskatoon, Chokecherry, Rose, Bur oak, Red-osier dogwood, Highbush cranberry, Gooseberry, Snowberry and Balsam poplar.
Herbs
Grasses like *Poa* sp. often with the highest ground cover values. Typical species included White-grained mountain rice grass, Lindley's aster, Snakeroot, Golden alexander, Poison ivy, Dewberry, Fringed loosestrife, Smooth wild strawberry, Meadow-rue, Northern bedstraw, Purple oat grass, Wild sarsaparilla, Two-leaved Solomon's seal and Bastard toadflax.
Birds
20 species recorded during point count survey; 31 species occurrences recorded for habitat type.
Mammals
Deer mouse caught in snap traps; bat data unavailable; four mammal species recorded including Coyote, White-tailed deer, Richardson's ground squirrel, and Deer mouse.
Amphibians and Reptiles
0 species recorded.
Invertebrates
0 dragonfly, 3 butterfly species recorded: Great spangled fritillary, Ringlet and Common wood nymph
Comments
Litter cover usually high.
For more information
Refer to Figures 8, 9, 10, 13, & 14 (Appendix VII) and Appendix VIII of this report.

Animal sampling was carried out in conjunction with the woodland vegetation transect in field A3b, a mature woodland. A total of 20 bird species were recorded during the bird point count

survey. Most of the species identified were typical of woodland habitat and species with preferences for interior and edge habitat were both represented. Common species included American crow, White-throated sparrow, Yellow-bellied sapsucker, Eastern phoebe, American robin and Hairy woodpecker. The two species more typical of shrub habitat were Eastern kingbird and Western kingbird. Wood thrush observations are outside this species' expected range, and should be confirmed. A total of 31 bird species were observed in the woodlands.

Bat data were unavailable at time of completion of this report. A total of four mammal species were recorded for pasture woodland: Coyote, White-tailed deer, Richardson's ground squirrel, and Deer mouse. No amphibian, reptile or dragonfly species were recorded. Butterfly species encountered were Great spangled fritillary, Ringlet and Common wood nymph.

ii) immature woodland

The transect sites that were categorized as immature were in fields A1a, A1d, A2c, A2d, A4, A4g, and B2c. One type of woodland that fell under this category was young, patchy stands of Trembling aspen that rarely exceeded 200m in length (the minimum length required to complete a transect). These woodland sites contained smaller, younger trees. The tall shrub layer was very sparse. Herbaceous ground cover and species richness were both lower than the more mature woodlands.

No animal sampling was carried out in immature woodland. Any species observed were included in species listing for pasture woodland.

Table 6 (b). Summary of Immature woodland habitat type, Alonsa Community Pasture.

IMMATURE WOODLAND
Transects A1a, A1d, A2c, A2d, A4, A4g, B2c
Location
Multiple; See Figure 3 for general locations and Appendix II for locations and dates.
Description
Woodland of mainly young Trembling aspen, but otherwise variable.
Woody Species
Small trees were typical; often low shrubs like Rose appeared to be dominant plant growth form; typical species included Trembling aspen, Willow, Balsam poplar, Saskatoon, Hazel, Snowberry, Dwarf birch, Red-osier dogwood, Wolf-willow, Honysuckle, Rose and Bur oak.
Herbs
Herb cover was often sparse; often quadrats sampled containing only one grass species, Kentucky blue grass, and few (if any) other herb species; typical species included Lindley's aster, Poison ivy, Vetchlings, Kentucky blue grass, Purple oat grass, Black medic, Smooth wild strawberry, Dewberry, Wild licorice, Fireweed, Sedges, Spreading dogbane, and Dandelion.
Birds, Mammals, Amphibians and Reptile, and Invertebrates
No animal sampling performed in this habitat type. Any species observed were included in pasture species listing.
Comments
Litter cover usually high.
For more information
Refer to Figures 7, 8, 9, 10, 12 & 13 (Appendix XII) and Appendix VIII of this report.

4. 2. 2. Grassland

Grassland sites from 27 fields were sampled which resulted in a wide range of features to use to describe this habitat type. Habitat quality and species composition both varied with moisture levels, grazing practices and whether the field was seeded. In many locations, there was encroachment by small shrub species such as Snowberry (*Symphoricarpos* sp.) and Wolf-willow (*Elaeagnus commutata*). There also tended to be high levels of bare ground and low levels of litter. In cases where grassland sites were visited both pre- and post-grazing, it appeared that taller, dominant grasses were grazed preferentially, opening the area up for different species. A total of 156 plant species were recorded for grassland habitat within the pasture.

Cattle trails were evident at all grassland sites. The greatest observable impacts tended to be in high-traffic areas such as along roads and near water sources.

Non-native plant species were common in many areas of the community pasture. Commonly encountered exotic species included grasses such as Smooth brome (*Bromus inermis*), Redtop (*Agrostis stolonifera*) and Timothy (*Phleum pratense*); legumes such as Sweet clover (*Melilotus* sp.) and Black medic *(Medicago lupulina*); and composites such as Sow thistle (*Sonchus* sp.), Canada thistle (*Cirsium arvense*) and Bull thistle (*Cirsium vulgare*). Some of these species are palatable to cattle and were seeded for forage.

The grassland habitat type was broken down into three broad categories based on data collected and inferred observations. These are i) good condition, ii)moderate condition and iii) poor condition. This classification was based on condition at time of sampling. Characteristics of the three conditions are described below and are based on the perspective of the study participants and not necessarily of PFRA.

i) Good Condition

Grassland transects within relatively good grassland habitat were in fields A1a, A1c, A2b, A2f, A3a, A4a, A4b, and B1c. Characteristics of good grassland were a combination of high number of plant species, high herbaceous cover values, moderate litter values, low cover of bare ground and overall appearance of good condition. This was based on a visual assessment and included characteristics such as even, erect growth of grass stems and relatively low levels of disturbance by cattle such as trampling.

The grassland bird point count transect and snap traps were carried out in field A3a, which was considered a grassland in good condition. Field A3a was a large expanse of open grassland with some wet patches supporting sedges. The grasses were tall and litter values were high. A few Hazelnut (*Corylus* sp.) shrubs and rock piles dotted the grassland. The field was bordered by gravel roads and major drainage ditches to the south and west. A total of 20 bird species were recorded during the point count survey. Common species typical of grassland habitat included Savannah sparrow, Western meadowlark, Common snipe and Clay-colored sparrow. A total of 36 bird species were recorded for pasture grassland habitat. A high proportion of the species were not typical of grassland habitat.

Five mammal species were observed: Coyote, White-tailed deer, Eastern cottontail, and Franklin's ground squirrel, and Meadow vole. Nine Meadow voles were caught in three nights of

snap trapping. Bat data were unavailable at time of completion of this report. Wood frog was the only amphibian species and Western plains garter snake was the only reptile species recorded. One dragonfly species (Canada darner) and 4 butterfly species (Cabbage white, Common sulphur, Northwest fritillary, Ringlet and Viceroy) were observed.

Table 7 (a). Summary of Good condition grassland habitat type, Alonsa Community Pasture.

GOOD CONDITION GRASSLAND
Transects A1a, A1c, A2b, A2f, A3a, A4a, A4b, and B1c.
Location
Multiple; See Figure 3 for general locations and Appendix II for locations and dates.
Description
A combination of high number of plant species, high herbaceous cover values, moderate litter values, low bare ground values and overall appearance of good condition; based on a visual assessment and included characteristics such as even, erect growth of grass stems and relatively low levels of disturbance by cattle such as trampling.
Herbs
Typical species included Kentucky blue grass, sedges, Poverty oat grass, Stiff goldenrod, Slender wheat grass, Red top, pussy-toes, Common vetch, Scratch grass, Smooth aster, violet, Soft millet, Sweet clover and Yarrow.
Birds
20 species detected in point count survey; 36 species total recorded for habitat.
Mammals
1 species, Meadow vole, caught using snap traps; 5 species recorded for habitat; including Coyote, White-tailed deer, Eastern cottontail, and Franklin's ground squirrel; bat data not available.
Amphibians and Reptiles
Wood frog and Western plains garter snake observed.
Invertebrates
1 dragonfly species (Canada darner) and 4 butterfly species (Cabbage white, Common sulphur, Northwest fritillary, Ringlet and Viceroy).
Comments
For more information
Refer to Figure 7, 9, 10, 12 & 14 (Appendix XII) and Appendix IX of this report.

ii) Moderate Condition

Grassland habitats assigned a moderate condition were sampled in fields A1d, A2, A2d, A2e, A3b, A4, A4c, A4e, B1, B1b, B2b and B2c. The grassland in this category demonstrated characteristics between good and poor condition. See i) good condition category, above and iii) poor condition category, below for characteristics.

No animal sampling was carried out in grassland of moderate condition. Any species observed were included in pasture grassland species listing.

Table 7 (b). Summary of Moderate condition grassland habitat type, Alonsa Community Pasture.

MODERATE CONDITION GRASSLAND
Transects A1d, A2, A2d, A2e, A3b, A4, A4c, A4e, B1, B1b, B2b, and B2c.
Location
Multiple; See Figure 3 for general locations and Appendix II for dates and locations.
Description
Demonstrating characteristics of grasslands both of good and poor condition, intermediate to the extremes of good and poor, relating to plant species present, herbaceous, litter, and bare ground cover values and overall appearance of the condition as indicated by growth habit of the species present.
Herbs
Typical species included Red top, Bluegrass, Poverty oat grass, Smooth brome, sedges, Smooth aster, Wheat grass, Stiff goldenrod, thistle, Blue-eyed grass, Yarrow, Common dandelion, Scratch grass, Black medic, Sweet clover, Foxtail, Smooth wild strawberry, Northern bedstraw, Heath aster, Common vetch, Reed grass, Common timothy and Black-eyed susan.
Birds, Mammals, Amphibians and Reptiles, Invertebrates
No data collected specifically for this grassland type but are expected to be similar to the grassland data from table 7 (a) above.
For more information
Refer to Figures 7, 8, 9, 10, 12, 13 &14 (Appendix XII) and Appendix IX of this report.

iii) Poor Condition

Grassland habitats of poor condition were sampled in fields A1, A2a, A2c, A3, A3c, A3d and B2. Assignment of these transects to the poor condition category was based on a combination of a low number of species, low herbaceous cover values, high bare ground, and appearance of poor condition as indicated by growth habit of the species present. This was based on a visual assessment and included characteristics such as sparse, spindly growth of grass stems and relatively high levels of disturbance by cattle such as trampling. These sites were often in high traffic areas such as near water sources and adjacent to fencelines.

No animal sampling was carried out in pasture grassland of poor condition. Any species observed were included in pasture grassland species listing.

Table 7 (c). Summary of Poor condition grassland habitat type, Alonsa Community Pasture.

POOR CONDITION GRASSLAND
Transects A1, A2a, A2c, A3, A3c, A3d and B2
Location
Multiple; See Figure 3 for general locations and Appendix II for dates and locations.
Description
A combination of a low number of species, low herbaceous cover values, high bare ground, and appearance of poor condition as indicated by growth habit of species present; based on a visual assessment and included characteristics such as sparse, spindly growth of grass stems and relatively high levels of disturbance by cattle such as trampling; these sites were often in high traffic areas such as near water sources and adjacent to fencelines.
Herbs
Typical species included Kentucky bluegrass, Wheat grass, Stiff goldenrod, Common timothy, Common plantain, Sweet clover, Black medic, Canada thistle, Common dandelion, sedge, Common pussy-toes, Red top, Black-eyed susan, Sow thistle and Baltic rush.
Birds, Mammals, Amphibians and Reptiles, Invertebrates
No data collected specifically for this grassland type but were expected to be similar to the grassland data from table 7(a) above.
Comments
These sites were often in high traffic areas such as near water sources and adjacent to fencelines.
For more information
Refer to Figures 7, 8, 9, 11 & 14 (Appendix XII) and Appendix IX of this report.

4. 2. 3. Wetland

There were large expanses of open wetland within the community pasture. Wetland sites from 3 fields were sampled. The wetlands encountered in the pasture tended to be dominated by sedges (*Carex* spp.), bulrush (*Scirpus* sp.), and wetland grasses along the somewhat drier margins. Transects were located near the margins of the wetland therefore vegetation data are biased to lower moisture species. The wetland areas appeared to be less used by grazing cattle than nearby uplands.

A total of 21 bird species were recorded during the bird point count survey. Common species typical of wetland habitat were Sedge wren, Mallard, Blue-winged teal and Marsh wren. Species more typical of other habitats were Western meadowlark, American crow and Barn swallow. The point count was performed near the edge of the wetland, which is bordered by grassland. A fenceline and lone tree were nearby. Also, some building structures were within 250 m of the transect. One Savannah sparrow was caught in the snap traps. A total of 43 bird species were recorded for pasture wetland habitat.

Two mammal species were recorded in the wetland habitat: Meadow vole and Coyote. No bat data was available at time of completion of this report. Two amphibian species, Boreal chorus frog and Wood frog, and one reptile species, Western plains garter snake, were observed. Two dragonfly species, Canada darner and Twelve-spotted skimmer, and two butterfly species, Great spangled fritillary and Common wood nymph, were observed.

Table 8. Summary of Wetland habitat type, Alonsa Community Pasture.

WETLAND
Transects A2f, A3c and A3d.
Location
Multiple; See Figure 3 for general locations and Appendix II for locations and dates.
Description
Flooded grassland in low-lying areas of the pasture; tended to be dominated by sedges (*Carex* spp.), bulrush (*Scirpus* sp.), and wetland grasses along the somewhat drier margins.
Herbs
Typical species included Reed grass, Awned sedge, bulrush, Baltic rush, Reed canary grass, Seaside arrow-grass, Heal-all, Woundwort and Common skullcap.
Birds
21 bird species detected during point count survey; 43 species total recorded for habitat.
Mammals
2 species, Coyote and Meadow vole, recorded for habitat.
Amphibians and Reptiles
2 amphibian species, Boreal chorus frog and Wood frog; Western plains garter snake.
Invertebrates
2 dragonfly species: Canada Darner and Twelve-spotted skimmer; 2 butterfly species: Great spangled fritillary and Common wood nymph.
Comments
Wetland areas appeared to be less used by grazing cattle than nearby uplands.
For more information
Refer to Figures 9 & 11 (Appendix XII) and Appendix X of this report.

4.3. Summary

Full species lists of all plant and animal taxa identified in Alonsa WMA and Alonsa Community Pasture can be found in Appendices XIII and XIV. Table 9 summarizes these results.

A total of 314 plant taxa were identified in the two sites, along with another 49 taxa that did not have their identities confirmed prior to the completion of the report. In a number of cases, the correct taxa may already have been documented in the inventory (i.e. *Betula* sp. may have been correctly identified as *Betula papyrifera*), so that counting these as additional taxa would represent a double count. It is acknowledged, however, that this creates an underestimate of species richness when an unidentified taxon (i.e. *Typha* sp.) is the only taxon included for that genus in the species list but it is omitted from the total.

The Alonsa WMA had a higher number of vascular plants than did the Alonsa Community Pasture, but had a lower number of non-native plant species. This is not unexpected, given that portions of the pasture have been cultivated with non-native species to improve conditions for grazing. On the whole, the lists of plant species were quite similar.

Table 9. Summary of plant and animal species data collected in Alonsa Wildlife Management Area and Alonsa Community Pasture, May – August 1999. "Species" include subspecies and varieties, where applicable. Species considered rare to uncommon based on Manitoba Conservation Data Centre species ranking system. Unidentified plants were not included in the total because they may already be identified correctly from other areas or times of the season.

Number of species of:	WMA	Community Pasture	Total
Plants			
Identified species	244	205	314
- Non-native plants	17	31	38
- Rare to uncommon plants	3	1	4
Unidentified species	34	37	49
Animals			
Birds	73	73	96
Mammals	16	7	17
Amphibians	3	2	3
Reptiles	1	1	1
Dragonflies	8	2	9
Butterflies	14	7	15
Total animal species	115	92	141

There were a total of four plant species considered provincially rare to uncommon according to the status ranks provided by Manitoba Conservation Data Centre. *Festuca hallii* (Plains rough fescue), *Cypripedium reginae* (Showy lady's slipper), and *Hypoxis hirsuta* (Yellow star grass) were all found in the WMA, and *Hieraciaum canadense* (Canada hawkweed) was found in the Community Pasture. Plains rough fescue is notable, in that it is the characteristic species of the fescue grassland associations that once covered central Saskatchewan. Manitoba's best remaining fescue grasslands are found in Riding Mountain National Park, but the community type is considered quite rare in Manitoba.

Animal species lists were typical of what would be expected in the aspen parkland of western Manitoba. The WMA and pasture both had the same number of bird species (73) observed. Three species were considered uncommon provincially by the Conservation Data Centre: American white pelican (*Pelecanus erythrorhynchos*), Black-crowned night heron (*Nycticorax nycticorax*), and Upland sandpiper (*Bartramia longicauda*). Reports of Wood thrush in both the WMA and Pasture should be verified, as they would be somewhat outside their expected range in Manitoba, and can be mistaken with other thrushes.

None of the mammals, reptiles or amphibians observed in the study areas are considered to be rare in Manitoba according to the Conservation Data Centre. Unfortunately, bat calls could not be identified prior to the production of this report, and bats are therefore absent from the species lists.

Invertebrate species lists are obviously incomplete, focusing on only the butterflies and dragonflies. Future inventories would benefit from having an entomological expert involved to better document the diversity of this very large species group.

None of the plants or animals observed during this inventory are listed as species at risk by COSEWIC federally, or under Manitoba's *Endangered Species Act*.

Difference in species composition in Alonsa WMA and Alonsa Community Pasture can be attributed to several factors:

(1) The WMA appears to contain a more diverse array of habitats. For instance, the treed bog plant communities in the WMA contain an assortment of "boreal" plant species such as Black spruce (*Picea mariana*), Tamarack (*Larix laricina*), Labrador tea (*Ledum groenlandicum*) and Small cranberry (*Vaccinium oxycoccos*) not found during the inventory in the Community Pasture.
(2) The Community Pasture has been modified through cultivation, brush removal and grazing to a greater extent than the WMA. This may have changed the species composition, favouring some disturbance tolerant species over others.
(3) Differences in sampling methods may have influenced the number of species found in the two sites. The faster but less intensive vegetation sampling performed in the Community Pasture resulted in more transects being sampled, but less time was spent at each location. Likewise, the number of animal sampling sites was lower in the Community Pasture than in the WMA, and could have led to fewer species being observed there.

Finally, it should be noted that species lists derived from inventories of this type are not all-inclusive. The absence of any plant or animal species expected to occur in this area from the final species lists does not necessarily indicate its absence from the area. Attempts to inventory an area greater than 23000 hectares in size in a roughly three month period are bound to miss a number of species.

On the whole, however, this document should serve as a useful guide to the flora and fauna of the Alonsa area, and provide a strong baseline data set for resource planning decisions in the region.

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Appendix I

Formulae used for data analysis

Plant Communities

Mean (canopy) cover = $\frac{\text{sum of estimated cover values (\%)}}{\text{number of plots sampled}}$

Mean density (trees or stems/plot) = $\frac{\text{total number of trees or stems}}{\text{number of plots sampled}}$

Mean density (trees or stems/ha) = $\frac{\text{mean density (trees or stems/plot)} \times 10\,000 m^2/ha}{\text{size of sample plot } (m^2)}$

Mean CBH = $\frac{\text{sum of CBH values (m)}}{\text{number of trees}}$

Frequency = $\frac{\text{number of sample units the species occurs in}}{\text{total number of units sampled}} \times 100$

Table 10. Density Distribution Class (DDC) for woody species in PFRA Community Pasture Forested (Woodland) vegetation transects.

Class	Distribution	Visual
1	Rare individual, a single occurrence	
2	A few sporadically occurring individuals	
3	A single patch or clump of a species	
4	Several sporadically occurring individuals	
5	A few patches or clumps of a species	
6	Several well spaced patches or clumps	
7	Continuous uniform occurrence of well spaced individuals	
8	Continuous occurrence of a species with a few gaps in the distribution	
9	Continuous dense occurrence of a species	

Animals

Average (number/period) = $\frac{\text{sum of birds detected}}{\text{number of periods}}$

Average (number/plot) = $\frac{\text{average (number/period)} \times 10}{\text{number of plots surveyed}} \times \frac{1}{10}$

*based on 10 plots

Abundance index = $\frac{\text{number of individuals caught}}{\text{number of traps x number of trap nights}}$

Appendix II

Locations and sampling dates of vegetation and animal transects in Alonsa Wildlife Management Area and Alonsa Community Pasture (All UTM co-ordinates NAD83, Zone 14).

Table 11. Locations and dates of vegetation transects in Alonsa Wildlife Management Area.

Transect	Description	Date	Location (Tp./R.)	UTM	
1	Prairie Ridge Grassland	1999-06-14	NE 30-22-13W	0482017 E	5642497 N
2	Scrubby Oak	1999-06-16	NW 31-22-13W	0480997 E	5643427 N
3	Aspen Woodland	1999-06-23	NE 21-2-13W	0481472 E	5643813 N
4	Treed Bog	1999-07-07	NE 20-22-13W	N/A	N/A
5	Wetland	1999-08-10	NE 30-22-13W	0481925 E	5642414 N
6	Burned Grassland	1999-08-11	SW 30-22-13W	0480861 E	5641222 N
7	Burned Woodland	1999-07-21	NW 30-22-13W	N/A	N/A
8	Prairie Ridge Grassland	1999-07-19	SW 15-22-13W	0486089 E	5638065 N

Table 12. Locations and dates of bird point count surveys in Alonsa Wildlife Management Area.

Transect	Habitat type	No. of plots	Date	Tp./R.	UTM plot 1	UTM plot 10 (5)
1	Woodland	10	1999-08-11,12	NW 31-22-13W to NW 32-22-13W	0481213 E 56439767 N	0482736 E 5643157 N
2	Grassland	10	1999-08-10,12	SW 31-22-13W to SE 29-22-13W	0481167 E 5643223 N	0483383 E 5641396 N
3	Wetland	5	1999-08-10,11	NE 30-22-13W to NW-29-22-13W	0481772 E 5642628 N	0482624 E 5642029 N

Table 13. Locations and dates of small mammal snap trap sampling in Alonsa Wildlife Management Area.

Transect	Habitat type	No. of traps	Date	Tp./R.	UTM trap 1	UTM trap 50 (25)
1	Woodland	25	1999-06-23-25	NE 31-22-13W	0481365 E 5643816 N	0481500 E 5643843 N
2	Grassland	50	1999-06-15-17	SE31-22-13W	0482077 E 5642427 N	0481724 E 5642741 N
3	Wetland	50	1999-08-10-12	NE 30-22-13W	0481775 E 5642637 N	0482164 E 5642176 N

Table 14. Locations and dates of bat monitoring in Alonsa Wildlife Management Area.

Habitat type	Date	Tp./R.	UTM	
Woodland	1999-08-10	NE-31-22-13W	0482049 E	5643538 N
Grassland	1999-08-09	NW21-22-13W	0484203 E	5640414 N
Wetland	1999-08-11	NE31-22-13W	0481775 E	5642637 N

Table 15. Location and dates of small mammal and amphibian pitfall trap sampling in Alonsa Wildlife Management Area.

Habitat	Date	Tp./R.	UTM	
Prairie ridge near wetland (Oak Lake)	1999-07-21,08-10-12	NW21-22-13W	0484203 E	5640414 N

Table 16. Location and dates of dragonfly surveying in Alonsa Wildlife Management Area.

Habitat	Date	Tp./R.	UTM	
Prairie ridge near wetland (Oak Lake)	various	NW 21-22-13W	0484203 E	5640414 N

Table 17 (a) to (c). Location, date and direction of vegetation transects in Alonsa Community Pasture.

(1999) Woodland transects

Field	Dir.	Date	Tp./R.	UTM plot 1		UTM plot 10	
A1a	N	1999-07-27	SW 17-19-11W	0502054 E	5608367 N	0502063 E	5608516 N
A1d	NW	1999-07-01	NE 6-19-11W	0501231 E	5605974 N	0501115 E	5606055 N
A2	W	1999-07-29	SW 2-20-12W	0497307 E	5614699 N	0497128 E	5614690 N
A2b	SSE	1999-07-27	SE 13-20-12W	0499622 E	5618241 N	0499648 E	5618073 N
A2c	SE/E	1999-07-29	NE 35-19-12 W	0498121 E	5614574 N	0498262 E	5614525 N
A2d	S	1999-07-29	NW 11-20-12W	0497474 E	5617845 N	0497518 E	5617642 N
A2f	NW	1999-07-17	SE 14-20-12W	0497927 E	5618664 N	0497810 E	5618814 N
A3b	S	1999-07-27	NW 29-20-11W	0501932 E	5622646 N	0501941 E	5622449 N
A4	S	1999-07-28	NW 7-20-11W	0500625 E	5617407 N	0500610 E	5617211 N
A4g	S	1999-08-18	NE 36-20-12W	0499975 E	5614534 N	0499986 E	5614359 N
B2	N	1999-07-06	NW 7-20-12W	0490675 E	5617220 N	0490749 E	5617030 N
B2b	N	1999-08-19	SW 5-20-12W	0492854 E	5614678 N	0492824 E	5614869 N
B2c	E	1999-08-19	SE 6-20-12W	0491566 E	5614696 N	0491746 E	5614697 N

(b) Grassland transects

Field	Dir.	Date	Tp./R.	UTM plot 1		UTM plot 10	
A1	SW	1999-07-27	NW 8-19-11W	0502088 E	5608017 N	0502017 E	5607940 N
A1a	S	1999-07-27	SW 17-19-11W	0501999 E	5608338 N	0502010 E	5608496 N
A1c	W	1999-07-27	SW 17-19-11W	0502635 E	5608063 N	0502462 E	5608063 N
A1d	NNW	1999-07-01	SW 6-19-11W	0501034 E	5605122 N	0500993 E	5605285 N
A2	N	1999-07-29	SW 2-20-12W	0497330 E	5614763 N	0497321 E	5614937 N
A2a	S	1999-08-18	SW 14-20-12W	0497350 E	5617925 N	0497327 E	5618083 N
A2b	ESE	1999-07-29	SE 13-20-12W	0499561 E	5618367 N	0499742 E	5618281 N
A2c	SW	1999-07-29	NW 36-19-12W	0499242 E	5614567 N	0499104 E	5614449 N
A2d	N	1999-08-18	NW 11-20-12W	0497469 E	5617654 N	0497392 E	5617840 N
A2e	N	1999-08-05	NW 3-20-12W	0495362 E	5615522 N	0495403 E	5615712 N
A2f	S	1999-07-17	SE 11-20-12W	0497876 E	5618609 N	0497926 E	5618427 N
A3	SE	1999-08-18	SW 16-20-11W	0503919 E	5618300 N	0503979 E	5618147 N
A3a	S	1999-07-16	SW 18-20-11W	0500452 E	5618428 N	0500468 E	5618238 N
A3b	N	1999-07-27	SW 32-20-11W	0501912 E	5622845 N	0501913 E	5623030 N
A3c	S	1999-07-09	SW 15-20-11W	0505138 E	5618611 N	0505165 E	5618420 N
A3d	NNW	1999-07-13	SE 16-20-11W	0504740 E	5618172 N	0504603 E	5618210 N

Cont`d...

Field	Dir.	Date	Tp./R.	UTM plot 1		UTM plot 10	
A4	S	1999-07-28	NW 7-20-11W	0500288 E	5617844 N	0500286 E	5617655 N
A4a	E	1999-08-04	SW 9-20-11W	0504264 E	5616275 N	0504463 E	5616277 N
A4b	SSE	1999-08-04	NW 4-20-11W	0504258 E	5616189 N	0504325 E	5616026 N
A4c	S	1999-08-04	NW 33-19-11W	0503654 E	5614495 N	0503683 E	5614304 N
A4e	S	1999-08-04	NE 9-20-11W	0504973 E	5617542 N	0504950 E	5617367 N
B1	N	1999-08-05	SE 9-20-12W	0494677 E	5616454 N	0494675 E	5616656 N
B1b	N	1999-08-05	SW 9-20-12W	0494265 E	5616538 N	0494301 E	5616715 N
B1c	E	1999-08-05	NE 4-20-12W	0494751 E	5616214 N	0494940 E	5616223 N
B2	S	1999-07-06	NW 7-20-12W	0490728 E	5617219 N	0490790 E	5617049 N
B2b	S	1999-08-19	SE 5-20-12W	0492901 E	5614915 N	0492908 E	5614727 N
B2c	W	1999-08-19	SE 6-20-12W	0491776 E	5614651 N	0491584 E	5614649 N

(c) Wetland transects

Field	Dir.	Date	Tp./R.	UTM plot 1		UTM plot 10	
A2f	SE	1999-07-17	SE 11-20-12W	0498002 E	5618696 N	0498064 E	5618560 N
A3c	NW	1999-07-13	SW 15-20-11W	0505292 E	5617935 N	0505161 E	5618030 N
A3d	S	1999-07-13	SE 16-20-11W	0504781 E	5618126 N	0504834 E	5617960 N

Table 18. Locations and dates of bird point count surveys in Alonsa Community Pasture.

Transect	Habitat type	No. of plots	Date	Tp./R.	UTM plot 1	UTM plot 10 (7)
1	Woodland	10	1999-07-27,28	NW 29-20-11W to SW 29-20-11W	0501903 E 5622606 N	0501955 E 5621260 N
2	Grassland	10	1999-08-18,19	SW 18-20-11W to SE 19-20-11W	0500287 E 5617907 N	0501825 E 5619018 N
3	Wetland	7	1999-08-18,19	SE 16-20-11W to NE 16-20-11W	0505061 E 5617842 N	0504760 E 5618925 N

Table 19. Locations and dates of small mammal snap trap sampling in Alonsa Community Pasture.

Transect	Habitat type	No. of traps	Date	Tp./R.	UTM trap 1	UTM trap 50 (25)
1	Woodland	25	1999-07-27-29	NW 29-20-11W	0501903 E 5622606 N	0501892 E 5622308 N
2	Grassland	50	1999-07-18-20	SW 18-20-11W	0500289 E 5617878 N	0500493 E 5618374 N
3	Wetland	50	1999-07-15-17	SE 16-20-11W	050486 E 56177802 N	0504675 E 5618303 N

Table 20. Location and dates of bat monitoring in Alonsa Community Pasture.

Habitat type	Date	Tp./R.	UTM	
Woodland	1999-07-29	NW 29-20-11W	0501903 E	5622606 N
Grassland	1999-08-19	SW 18-20-11W	0505061E	5617842 N
Wetland	1999-08-18	SE 16-20-11W	0497487 E	5614593 N

Table 21. Location and dates of dragonfly surveying in Alonsa Community Pasture.

Habitat	Date	Tp./R.	UTM	
Field A2 – drainage ditch near wetland	various	NW 35-20-12W	0497487 E	5614593 N

Appendix III

Data summary, Treed Bog habitat (Transect 4), Alonsa Wildlife Management Area.

Table 22. Mean canopy cover, mean density, mean circumference at breast height (CBH) and frequency of tree species in transect 4, sampled July 7, 1999 (n = 1 plot, 10m x 10m).

Species	Mean canopy cover (%)	Mean density (trees/plot)	Mean density (trees/ha)	Mean CBH (cm)	Frequency (%)
Picea mariana	30.00	14.00	1400.00	34.57	100
Larix laricina	15.00	6.00	600.00	40.08	100

Table 23. Mean cover, mean density and frequency of shrub species occurring in transect 4, sampled July 7, 1999 (n = 1 plot, 5 m x 5m).

Species	Mean cover (%)	Mean density (stems/plot)	Mean density (stems/ha)	Frequency (%)
Cornus stolonifera	10.00	11.00	4400.00	100
Rhamnus alnifolia	5.00	4.00	1600.00	100
Lonicera sp.	10.00	10.00	4000.00	100
Betula sp.	5.00	3.00	1200.00	100

Table 24. Mean cover and frequency of herbaceous and low shrub species occurring in transect 4, sampled July 7, 1999 (n = 8 quadrats, 1m x 1m).

Species	Mean cover (%)	Frequency (%)
Moss	60.0	100.0
Litter	32.2	100.0
Rubus pubescens	10.5	100.0
Ledum groenlandicum	8.4	87.5
Linnaea borealis	7.2	100.0
Carex sp. (large)	7.0	50.0
(*Orchis rotundifolia*)	6.4	62.5
Betula papyrifera	6.4	62.5
Cornus canadensis	5.6	37.5
Trientialis borealis	3.6	100.0
Bare ground	3.3	100.0
Rhamnus alnifolia	3.1	62.5
Smilacina stellata	2.6	37.5
Cornus stolonifera	2.6	37.5
Carex sp.(small)	2.5	75.0
Petasites sagittatus	2.3	25.0
Viola sp.	1.9	75.0
Menyanthes trifoliata	1.9	25.0
Cypripedium reginae	1.9	12.5
Pyrola sp.	1.5	50.0

Cont'd...

Species	Mean cover (%)	Frequency (%)
Galium boreale	1.3	75.0
Equisetum sp.	0.9	62.5
Lonicera involucrata	0.9	62.5
Vaccinium oxycoccos	0.8	25.0
Mitella nuda	0.8	25.0
Smilacina trifolia	0.6	50.0
Unidentified sp. (opp. lvs)	0.5	37.5
Potentilla fruticosa	0.4	25.0
Galium triflorum	0.4	25.0
Viburnum opulus	0.4	12.5
UnID sp. (whorl of 5 lvs.)	0.4	12.5
Solidago sp.	0.1	25.0
Picea mariana	0.1	12.5
Fragaria virginiana	0.1	12.5
Parnassia sp.	0.1	12.5

Table 25. List of all species observed in Treed Bog habitat type.

Plants		
Andromeda glaucophylla	*Halenia deflexa*	*Populus tremuloides*
Aralia nudicaulis	*Larix laricina*	*Potentilla fruticosa*
Betula papyrifera	*Ledum groenlandicum*	*Prunus virginiana*
Botrychium virginiana	*Linnaea borealis*	*Pyrola asarifolia*
Carex disperma	*Lonicera involucrata*	*Pyrola* sp.
Carex spp.	*Lonicera oblongifolia*	*Rhamnus alnifolia*
Coeloglossum viride	*Lysimachia thyrsiflora*	*Rubus pubescens*
Cornus canadensis	*Menyanthes trifoliata*	*Salix candida*
Cornus stolonifera	*Mitella nuda*	*Sanicula marilandica*
Cypripedium reginae	*Orchis rotundifolia*	*Sarracenia purpurea*
Drosera rotundifolia	*Orchis* sp.	*Smilacina stellata*
Epilobium angustifolium	*Parnassia* sp.	*Smilacina trifolia*
Equisetum fluviatile	*Petasites sagittatus*	*Solidago* sp.
Equisetum scirpoides	*Picea glauca*	*Trientalis borealis*
Equisetum sp.	*Picea mariana*	*Vaccinium oxycoccos*
Fragaria virginiana	*Platanthera hyperborea*	*Viburnum opulus*
Galium boreale	*Platanthera obtusata*	*Viola nephrophylla*
Galium triflorum	*Polygala paucifolia*	*Viola* sp.
Mammals		
Rabbit (species not identified)	White-tailed deer	
Amphibians		
Wood frog	Tree frog	
Butterflies		
Common wood nymph		

Appendix IV

Data summary, Trembling Aspen Woodland habitat (transect 1) and burned Trembling Aspen Woodland (transect 7), Alonsa Wildlife Management Area

Table 26. Mean canopy cover, mean density, mean circumference at breast height (CBH) and frequency of tree species in transect 1, sampled June 23, 1999 (n = 3 plots, 10m x 10m).

Species	Mean canopy cover (%)	Mean density (trees/plot)	Mean density (trees/ha)	Mean CBH (cm)	Frequency (%)
Populus tremuloides	33.33	10.33	1033	52.43	100
Salix sp.	<10	0.33	33	5.60	33.3

Table 27. Mean cover, mean density and frequency of shrub species occurring in transect 3, sampled June 23, 1999 (n = 3 plots, 5 m x 5m).

Species	Mean cover (%)	Mean density (stems/plot)	Mean density (stems/ha)	Frequency (%)
Corylus sp.	33.33	35.33	14133.33	66.7
Cornus stolonifera	16.67	16.67	6666.67	33.3
Amelanchier alnifolia	13.33	6.33	2533.33	66.7
Betula sp.	13.33	11.33	4533.33	66.7
Rosa sp.	10.00	4.67	1866.67	66.7
Viburnum opulus	8.33	4.00	1600.00	33.3
Prunus virginiana	6.67	3.33	1333.33	66.7
Salix sp.	6.67	2.33	933.33	66.7
Populus tremuloides	3.33	0.67	266.67	33.3
Rhamnus alnifolia	3.33	1.67	666.67	33.3
Lonicera dioica	1.67	0.67	266.67	33.3
Quercus macrocarpa	1.67	0.67	266.67	33.3
Ribes sp.	1.00	1.67	666.67	33.3
Viburnum rafinesquianum	1.00	3.33	1333.33	33.3

Table 28. Mean cover and frequency of herbaceous and low shrub species occurring in transect 3, sampled June 23, 1999 (n = 5 quadrats, 1m x 1m).

Species	Mean cover (%)	Frequency (%)
Litter	97.50	100.0
Aralia nudicaulis	10.70	46.7
Rosa sp.	10.23	60.0
Oryzopsis asperifolia	9.30	100.0
Corylus sp.	7.93	53.3
Rhus radicans	7.90	53.3
Maianthemum canadense	7.37	73.3
Rubus idaeus	7.00	46.7
Pyrola sp.	6.07	80.0
Cont'd...		

Species	Mean cover (%)	Frequency (%)
Lonicera sp.	5.77	73.3
Fragaria virginiana	5.50	93.3
Ribes sp.	5.00	33.3
Sanicula marilandica	4.83	60.0
Thalictrum sp.	4.50	86.7
Cornus stolonifera	4.20	33.3
Symphoricarpos sp.	4.03	60.0
Aster ciliolatus	4.03	33.3
Solidago sp.	3.60	40.0
Carex sp.	3.10	40.0
Cornus canadensis	2.63	40.0
Petasites sagittatus	2.60	33.3
Rhamnus alnifolia	2.20	20.0
Galium boreale	1.87	46.7
Equisetum sp.	1.80	33.3
Viburnum rafinesquianum	1.40	20.0
Lathyrus sp.	1.33	66.7
Galium triflorum	1.27	26.7
Comandra umbellata	1.00	6.7
Lysimachia ciliata	0.80	26.7
Viola spp.	0.70	40.0
Epilobium angustifolium	0.60	53.3
Mitella nuda	0.60	20.0
Bare ground	0.50	100.0
Amelanchier alnifolia	0.40	13.3
Betula sp.	0.40	13.3
Smilacina stellata	0.40	13.3
Cypripedium calceolus	0.40	13.3
Vicia americana	0.27	20.0
Quercus macrocarpa	0.27	20.0
Prunus virginiana	0.20	6.7
Viburnum opulus	0.20	6.7
UnID orchid sp.	0.07	13.3
UnID composite sp.	0.03	6.7
Zizia sp.	0.03	6.7

Table 29. Mean canopy cover, mean density, mean circumference at breast height (CBH) and frequency of tree species in transect 7, Burned woodland, sampled July 21, 1999 (n = 2 plots, 10m x 10m).

Species	Mean canopy cover (%)	Mean density (trees/plot)	Mean density (trees/ha)	Mean CBH (cm)	Frequency (%)
Populus balsamifera	5	0.50	50.00	45	50

Table 30. Mean cover, mean density and frequency of shrub species occurring in transect 7, Burned woodland, sampled July 21, 1999 (n = 2 plots, 5 m x 5m).

Species	Mean cover (%)	Mean density (stems/plot)	Mean density (stems/ha)	Frequency (%)
Populus tremuloides	85.00	100	40000	100
Corylus americana	17.50	17.5	7000	100
Prunus virginiana	17.50	17.5	7000	100
Quercus macrocarpa	25.00	12.5	5000	50
Rosa sp.	5.00	2.5	1000	50
Salix sp.	5.00	2	800	50
Lonicera dioica	5.00	0.5	200	50

Table 31. Mean cover and frequency of herbaceous and low shrub species occurring in transect 7, Burned woodland, sampled July 21, 1999 (n = 10 quadrats, 1m x 1m).

Species	Mean cover (%)	Frequency (%)
Litter	80.5	100
Corylus americana	19.05	90
Aralia nudicaulus	17.25	100
Populus tremuloides	12.15	90
Amelanchier alnifolia	9.6	80
Maianthemum canadense	8.45	90
Symphoricarpos sp.	7.5	90
Bare ground	7.3	100
Lathyrus ochreleucus	6.65	70
Rosa sp.	6.3	50
Carex sp. (small)	5.4	60
Oryzopsis asperifolia	4.8	80
Prunus virginiana	3	20
Galium boreale	2.7	50
Aster ciliolatus	2.4	40
Vicia americana	2.4	40
Thalictrum sp.	1.5	50
Apocynum androsaemifolium	1.5	50
Quercus macrocarpa	1.5	10
Salix sp.	1.5	10
Sanicula marilandica	1.2	40
Taraxacum officinale	0.6	20
Comandra umbellata	0.6	20
Fragaria virginiana	0.6	20
Geranium bicknellii	0.4	30
Agastache foeniculum	0.35	20
Rhus radicans	0.35	20
Smilax lasioneura	0.3	10
Lycopus asper	0.3	10
Lithospermum canescens	0.3	10
Polygala senega	0.05	10

Table 32. Number of birds detected per period, average number per period and average number per plot (based on 10 plots) for each species recorded in point count survey transect 1 (10 plots).

Species	Period 1 11-Aug	Period 2 12-Aug	Average (number/period)	Average (number/plot)
Broad-winged hawk	0	1	0.5	0.05
Mourning dove	0	2	1.0	0.10
Sharp-tailed grouse	0	1	0.5	0.05
Hairy woodpecker	2	5	3.5	0.35
Pileated woodpecker	1	0	0.5	0.05
Northern flicker	1	3	2.0	0.20
Yellow-bellied sapsucker	1	1	1.0	0.10
American crow	0	2	1.0	0.10
Red-eyed vireo	7	4	5.5	0.55
Solitary vireo	1	0	0.5	0.05
Philadelphia vireo	1	0	0.5	0.05
Warbling vireo	0	1	0.5	0.05
American redstart	2	3	2.5	0.25
Red-breasted nuthatch	1	0	0.5	0.05
Scarlet tanager	1	2	1.5	0.15
Veery	0	4	2.0	0.20
Wood thrush	1	1	1.0	0.10
Brown creeper	1	1	1.0	0.10
Ovenbird	1	1	1.0	0.10
Eastern phoebe	1	0	0.5	0.05
Least flycatcher	0	1	0.5	0.05
Great-crested flycatcher	0	1	0.5	0.05
Ruby-crowned kinglet	1	0	0.5	0.05
Tennessee warbler	2	1	1.5	0.15
Black-and-white warbler	1	0	0.5	0.05
Rose-breasted grosbeak	3	3	3.0	0.30
Song sparrow	1	1	1.0	0.10
White-throated sparrow	2	2	2.0	0.20
Totals	32	41	36.5	3.65

Table 33. Number of animals caught per trap night, total number caught and abundance index for each species recorded in snap trap transect 1 (25 traps).

Species	Night 1 (23-Jun)	Night 2 (24-Jun)	Night 3 (25-Jun)	Total	Abundance index (n=3 x 25)
Deer mouse	1	0	0	1	0.0133
Southern red-backed vole	0	3	0	3	0.04
Totals	1	3	0	4	0.0533

Table 34. List of all species observed in Trembling Aspen Woodland (* = plants recorded in burned area)

Plants		
*Agastache foeniculum**	*Galium triflorum*	*Pyrola virens*
*Amelanchier alnifolia**	*Geranium bicknellii**	*Quercus macrocarpa**
Anemone virginiana	*Lathyrus ochreleucus**	*Rhamnus alnifolia*
*Apocynum androsaemifolium**	*Lathyrus* sp.	*Rhus radicans**
*Aralia nudicaulus**	*Lathyrus venosus*	*Ribes hirtellum*
*Aster ciliolatus**	*Lithospermum canescens**	*Ribes triste*
Betula glandulosa	*Lonicera dioica*	*Rubus idaeus*
Betula pumila var. *glandulifera*	*Lonicera oblongifolia*	*Rubus pubescens*
Betula sp.	*Lonicera* sp.	*Salix* sp.*
Carex sp.*	*Lychnis alba*	*Sanicula marilandica**
*Comandra umbellata**	*Lycopus asper**	*Schizachne purpurascens*
Cornus canadensis	*Lysimachia ciliata*	*Shepherdia canadensis*
Cornus stolonifera	*Maianthemum canadense**	*Smilacina stellata*
*Corylus americana**	*Mitella nuda*	*Smilax lasioneura**
Corylus sp.	*Monotropa uniflora*	*Solidago* sp.
Crataegus rotundifolia	*Oryzopsis asperifolia**	*Symphoricarpos* sp.*
Coeloglossum viride	*Petasites sagittatus*	*Taraxacum officinale**
Cypripedium calceolus	*Pinus banksiana*	*Thalictrum* sp.*
Cypripedium reginae	*Poa palustris*	*Thalictrum venulosum*
*Dracocephalum parviflorum**	*Polygala senega**	*Ulmus americana*
Elymus canadensis	*Populus tremuloides**	*Valeriana dioica*
Epilobium angustifolium	*Populus balsamifera*	*Viburnum opulus*
Equisetum arvense	*Potentilla argentea*	*Viburnum rafinesquianum*
Equisetum sp.	*Potentilla fruticosa*	*Vicia americana**
*Fragaria virginiana**	*Prunus virginiana**	*Viola* sp.
Fraxinus pennsylvanica	*Pyrola asarifolia*	*Zizia aurea*
*Galium boreale**		

Birds		
American crow	Great-crested flycatcher	Ruby-crowned kinglet
American goldfinch	Hairy woodpecker	Ruffed grouse
American redstart	Least flycatcher	Scarlet tanager
American robin	Mourning dove	Sharp-tailed grouse
Black-and-white warbler	Nashville warbler	Solitary vireo
Black-capped chickadee	Northern flicker	Song sparrow
Blue Jay	Ovenbird	Tennessee warbler
Broad-winged hawk	Philadelphia vireo	Veery
Brown creeper	Pileated woodpecker	Warbling vireo
Brown thrasher	Red-breasted nuthatch	Whip-poor-will
Cedar waxwing	Red-eyed vireo	White-throated sparrow
Chestnut-sided warbler	Red-tailed hawk	Wood thrush
Eastern kingbird	Rose-breasted grosbeak	Yellow-bellied sapsucker
Eastern Phoebe		

Cont'd...

Mammals		
Coyote	Elk	Thirteen-lined ground squirrel
Deer mouse	Southern red-backed vole	White-tailed deer
Eastern chipmunk	Richardson's ground squirrel	White-tailed jackrabbit
Amphibians		
Gray treefrog		
Butterflies		
Common wood nymph	Peck's skipper	Pepper and salt skipper
Gorgone checkerspot	Ringlet	Silvery checkerspot
Great spangled fritillary		

Appendix V

Data summary, Scrubby Oak habitat (transect 2), Alonsa Wildlife Management Area.

Table 35. Mean canopy cover, mean density, mean circumference at breast height (CBH) and frequency of tree species in transect 2, sampled June 16, 1999 (n = 3 plots, 10m x 10m).

Species	Mean canopy cover (%)	Mean density (trees/plot)	Mean density (trees/ha)	Mean CBH (cm)	Frequency (%)
Quercus macrocarpa	16.67	4.33	433.00	25.11	100
Populus tremuloides	<5	0.33	33.00	5.16	33.3

Table 36. Mean cover, mean density and frequency of shrub species occurring in transect 2, sampled June 16, 1999 (n = 3 plots, 5 m x 5m).

Species	Mean cover (%)	Mean density (stems/plot)	Mean density (stems/ha)	Frequency (%)
Prunus sp.	<1	0.67	268.00	66.7
Quercus macrocarpa	5	3.00	1200.00	66.7

Table 37. Mean cover and frequency of herbaceous and low shrub species occurring in transect 2, sampled June 16, 1999 (n = 15 quadrats, 1m x 1m).

Species	Mean cover (%)	Frequency (%)
Litter	83.50	100
Other grass spp. (total)	17.10	10
Amelanchier alnifolia	17.10	100
Galium boreale	13.23	100
Poa sp.	12.40	100
Symphoricarpos sp.	10.87	93.3
Arctostaphylos uva-ursi	10.43	93.3
Lathyrus sp.	8.57	86.7
Vicia americana	7.87	86.7
Bare ground	6.20	100
Quercus macrocarpa	4.50	20
Composite spp.	3.40	66.7
Solidago sp.	3.07	60
Astragalus sp.	2.90	60
Comandra umbellata	2.87	53.3
Salix sp.	2.60	33.3
Thalictrum sp.	1.20	13.3
Coeloglossum viride	1.20	13.3
Lithospermum canescens	1.03	40
Achillea millefolium	0.97	60
Aster laevis	0.97	60
Monarda fistulosa	0.90	46.7
Cont'd...		

Species	Mean cover (%)	Frequency (%)
Anemone patens	0.83	33.3
Melilotus officinalis	0.50	33.3
Potentilla (argentea)	0.83	13.3
Antennaria sp.	0.47	26.7
Rosa sp.	0.40	13.3
Agoseris glauca	0.40	13.3
unID mint-like forb	0.40	13.3
Viola sp.	0.33	33.3
Cerastium arvense	0.23	46.7
Anemone canadense	0.20	40
Artemisia frigida	0.20	6.7
Helianthus sp.	0.20	6.7
Apocynum androsaemifolium	0.20	6.7
Aster ciliolatus	0.20	6.7
Corylus sp.	0.20	6.7
Heuchera richardsonii	0.20	6.7
Campanula rotundifolia	0.17	40
Sisyrinchium montanum	0.17	33.3
Erigeron sp.	0.03	6.7
Plantago major	0.03	6.7
unID forb	0.03	6.7
Zizia aptera	0.03	6.7
Artemisia ludoviciana	0.03	6.7

Table 38. List of all plant species observed in Scrubby Oak.

Plants		
Achillea millefolium	*Coeloglossum viride*	*Populus tremuloides*
Agoseris glauca	*Comandra umbellata*	*Potentilla argentea*
Amelanchier alnifolia	*Corylus* sp.	*Psoralea esculenta*
Anemone canadense	*Dalea purpurea*	*Quercus macrocarpa*
Anemone patens	*Erigeron* sp.	*Ranunculus* sp.
Antennaria sp.	*Fragaria virginiana*	*Rosa* sp.
Apocynum androsaemifolium	*Galium boreale*	*Salix* sp.
Arabis divaricarpa	*Geum triflorum*	*Schizachne purpurascens*
Arctostaphylos uva-ursi	*Helianthus* sp.	*Sisyrinchium montanum*
Artemisia frigida	*Heuchera richardsonii*	*Smilax lasioneura*
Artemisia ludoviciana	*Koeleria cristata*	*Solidago* sp.
Aster ciliolatus	*Lathyrus* sp.	*Stipa* sp.
Aster laevis	*Lithospermum canescens*	*Symphoricarpos* sp.
Astragalus sp.	*Melilotus officinalis*	*Thalictrum* sp.
Bromus porteri	*Monarda fistulosa*	*Vicia americana*
Campanula rotundifolia	Oryzopsis asperifolia	*Viola sp.*
Cerastium arvense	*Plantago major*	*Zizia aptera*
Cirsium muticum	*Poa* sp.	

* No animal observations were made in scrubby oak habitat.

Appendix VI

Data summary, Prairie Ridge Grassland habitat (Transects 1 and 6), Alonsa Wildlife Management Area.

Table 39. Mean cover and frequency of herbaceous and low shrub species occurring in transect 1, sampled June 14, 1999 (n = 15 quadrats, 1m x 1m) and 8, sampled July 19, 1999 (n = 10 quadrats, 1m x 1m).

Species	Mean cover (%)	Frequency (%)
Litter	49.50	100.0
Bare Ground	26.10	100.0
Stipa sp.	14.46	64.0
Poa sp.	12.96	60.0
Poa pratensis	12.30	40.0
Koeleria cristata	9.00	80.0
Moss and lichens	8.86	60.0
Danthonia spicata	6.20	40.0
Comandra umbellata	6.02	60.0
Galium boreale	5.54	76.0
Amelanchier alnifolia	5.04	40.0
Symphoricarpos sp.	5.04	40.0
Erigeron sp.	4.50	64.0
Helianthus laetiflorus	3.70	48.0
unID grass sp.	3.12	28.0
Asclepias ovalifolia	3.00	36.0
Carex sp.	2.80	52.0
Helictotrichon hookeri	2.78	32.0
Lathyrus sp.	2.76	28.0
Monarda fistulosa	2.76	48.0
unID composite spp.	2.66	60.0
Prunus pumila	2.42	20.0
Rosa sp.	2.42	56.0
Anemone patens	2.32	36.0
Panicum sp.	1.68	24.0
Agrostis stolonifera	1.56	20.0
Prunus virginiana	1.56	20.0
Aster laevis	1.48	40.0
Astragalus sp.	1.36	20.0
Agastache foeniculum	1.34	16.0
Agropyron (trachycaulum)	1.34	32.0
Artemisia campestris	1.30	44.0
Achillea millefolium	1.28	76.0
Poa compressa	1.08	20.0
Potentilla sp.	0.86	32.0
Artemisia ludoviciana	0.84	12.0
Smilacina stellata	0.74	12.0
Antennaria sp.	0.60	4.0
Solidago sp.	0.54	28.0
Artemisia frigida	0.42	24.0
Cont'd...		

Species	Mean cover (%)	Frequency (%)
Bromus porteri	0.40	20.0
Thalictrum sp.	0.38	16.0
Vicia americana	0.36	12.0
Hierochlöe odorata	0.22	24.0
Liatris sp.	0.22	24.0
Sisyrinchium montanum	0.20	40.0
Lithospermum canescens	0.18	16.0
Lobelia spicata	0.18	16.0
Viola (adunca)	0.18	36.0
Gaillardia aristata	0.16	12.0
Agrostis hyemalis	0.14	8.0
Agropyron sp.	0.12	4.0
Anemone cylindrica	0.12	4.0
Bromus ciliatus	0.12	4.0
Panicum capillare	0.12	4.0
Psoralea esculenta	0.12	4.0
Solidago rigida	0.12	4.0
Cerastium arvense	0.10	20.0
Allium stellatum	0.08	16.0
unID crucifer sp.	0.06	12.0
Anemone sp.	0.04	8.0
Heuchera richardsonii	0.04	8.0
Lilium philadelphicum	0.04	8.0
Silene sp.	0.04	8.0
Androsace septentrionalis	0.02	4.0
Astragalus crassicarpus	0.02	4.0
Viola pedatifida	0.02	4.0

Table 40. Mean cover and frequency of herbaceous and low shrub species occurring in transect 6, Burned grassland, sampled August 11, 1999 (n = 15 quadrats, 1m x 1m).

Species	Mean cover (%)	Frequency (%)
Bare ground	31.90	100
Litter	24.00	100
Poa pratensis	19.57	100
Andropogon scoparius	14.90	100
Carex spp.	12.60	100
Solidago spp.	9.20	93.3
Agropyron (trachycaulum)	7.83	80
Stipa sp.	7.00	73.3
Koeleria cristata	6.80	93.3
Geum triflorum	4.87	66.7
Artemisia ludoviciana	4.60	46.7
Andropogon gerardii	4.50	20
Galium boreale	4.43	100
Aster laevis	4.40	66.7
Oxytropis sp.	4.40	40
Cont'd...		

Species	Mean cover (%)	Frequency (%)
Monarda fistulosa	4.40	40
Aster ericoides	4.07	93.3
Danthonia spicata	3.00	46.7
Agrostis scabra	3.00	46.7
Comandra umbellata	2.70	80
Helictotrichon hookeri	2.40	26.7
Sporobolus heterolepis	2.20	20
Anemone canadensis	1.87	46.7
Achillea millefolium	1.83	100
Aster ptarmicoides	1.43	53.3
Rosa sp.	1.40	46.7
Lathyrus sp.	1.40	20
Amelanchier alnifolia	1.20	13.3
Arctostaphylos uva-ursi	1.20	13.3
Dalea purpurea	1.03	40
Potentilla (arguta)	0.87	40
Helianthus laetiflorus	0.83	33.3
Astragalus sp.	0.80	26.7
Anemone patens	0.73	46.7
Penstemon gracilis	0.73	46.7
Viola (adunca)	0.67	66.7
Antennaria neodioica	0.63	60
Lithospermum canescens	0.63	26.7
Campanula rotundifolia	0.60	86.7
Bromus porteri	0.60	20
Psoralea esculenta	0.40	13.3
Bouteloua gracilis	0.40	13.3
Astragalus crassicarpus	0.40	13.3
Artemisia frigida	0.40	46.7
Artemisia campestris	0.40	13.3
Arabis sp.	0.27	20
Allium stellatum	0.23	46.7
Aster ciliolatus	0.23	13.3
Heuchera richardsonii	0.23	13.3
Zizia aptera	0.23	13.3
Cerastium arvense	0.23	6.7
Solidago rigida	0.20	6.7
Agoseris glauca	0.20	6.7
Prunus pumila	0.20	6.7
Melilotus alba	0.20	6.7
Sisyrinchium montanum	0.10	20
Potentilla (argentea)	0.03	6.7

Table 41. Number of birds detected per period, average number per period and average number per plot (based on 10 plots) for each species recorded in point count survey transect 2 (10 plots).

Species	Period 1 10-Aug	Period 2 12-Aug	Average (number/day)	Average (number/plot)
Sandhill crane	0	1	0.5	0.05
Blue-winged teal	2	0	1.0	0.10
Upland sandpiper	1	0	0.5	0.05
Marbled godwit	1	1	1.0	0.10
Whip-poor-will	0	1	0.5	0.05
Northern harrier	0	1	0.5	0.05
Swainson's hawk	1	0	0.5	0.05
Sharp-tailed grouse	1	0	0.5	0.05
Mourning dove	2	4	3.0	0.30
American crow	2	2	2.0	0.20
Black-billed magpie	0	1	0.5	0.05
Eastern kingbird	4	7	5.5	0.55
Common yellowthroat	1	0	0.5	0.05
Clay-colored sparrow	5	3	4.0	0.40
Savannah sparrow	6	8	7.0	0.70
Vesper sparrow	2	2	2.0	0.20
Song sparrow	3	2	2.5	0.25
Totals	31	33	32.0	3.20

Table 42. Number of animals caught per trap night, total number caught and abundance index for each species recorded in snap trap transect 2 (50 traps).

Species	Night 1 (15-Jun)	Night 2 (16-Jun)	Night 3 (17-Jun)	Total	Abundance index (n=3 x 50)
Savannah sparrow	1	0	0	1	0.0067
Totals	1	0	0	1	0.0067

Table 43. List of all species observed in Prairie Ridge Grassland (*=recorded in burn area):

Plants		
*Achillea millefolium**	*Carex* spp.*	*Oxytropis lambertii*
Agastache foeniculum	*Cerastium arvense**	*Oxytropis* sp.*
*Agoseris glauca**	*Chrysopsis villosa*	*Panicum capillare*
Agropyron repens	*Comandra umbellata**	*Panicum lanuginosum*
Agropyron smithii	*Dalea candida*	*Parnassia* sp.
*Agropyron trachycaulum**	*Dalea purpurea**	*Penstemon gracilis**
*Agrostis hyemalis**	*Danthonia spicata**	*Phleum pratense*
Agrostis stolonifera	*Erigeron asper*	*Poa compressa*
*Allium stellatum**	*Erigeron glabellus**	*Poa nemoralis*
*Amelanchier alnifolia**	*Erigeron strigosus*	*Poa palustris*
*Andropogon gerardii**	*Erysimum asperum*	*Poa pratensis**
*Andropogon scoparius**	*Erysimum cheiranthoides*	*Polygala senega*
*Androsace septentrionalis**	*Erysimum inconspicuum*	*Polygonum convulvulus**
*Anemone canadensis**	*Festuca elatior*	*Potentilla anserina*
Cont'd...		

Plants (Cont'd)		
Anemone cylindrica	*Festuca hallii*	*Potentilla argentea**
*Anemone patens**	*Gaillardia aristata*	*Potentilla arguta**
*Antennaria neodioica**	*Galium boreale**	*Prenanthes alba*
Antennaria parvifolia	*Gentiana andrewsii*	*Prunus pumila**
Apocynum androsaemifolium	*Geum triflorum**	*Prunus virginiana*
Apocynum cannabinum	*Helianthus laetiflorus**	*Psoralea esculenta**
Arabis divaricarpa	*Helictotrichon hookeri**	*Rosa* sp.*
Arabis hirsuta	*Heuchera richardsonii**	*Rudbeckia hirta*
Arabis sp.*	*Hierochlöe odorata*	*Sanicula marilandica*
*Arctostaphylos uva-ursi**	*Houstonia longifolia*	*Secale cereale*
Arenaria stricta var. *dawsonensis*	*Juncus dudleyi*	*Senecio canus*
*Artemisia campestris**	*Koeleria cristata**	*Senecio* sp.
*Artemisia frigida**	*Lathyrus* sp.*	*Silene* sp.
*Artemisia ludoviciana**	*Liatris ligulistylis*	*Sisyrinchium montanum**
Asclepias ovalifolia	*Liatris punctata*	*Smilacina stellata*
*Aster ciliolatus**	*Lilium philadelphicum*	*Solidago graminifolia*
*Aster ericoides**	var. *andinum*	*Solidago hispida*
*Aster laevis**	*Linum perenne*	*Solidago missouriensis*
Aster lateriflorus	*Lithospermum canescens**	*Solidago nemoralis*
*Aster ptarmicoides**	*Lobelia spicata*	*Solidago rigida**
Aster simplex	*Melilotus alba**	*Spiraea alba*
Aster umbellatus	*Monarda fistulosa**	*Sporobolus heterolepis**
Astragalus adsurgens	*Muhlenbergia asperifolia*	*Stipa spartea**
*Astragalus crassicarpus**	*Muhlenbergia cuspidata*	*Symphoricarpos occidentalis*
Botrychium virginianum	*Muhlenbergia glomerata**	*Symphoricarpos* sp.
*Bouteloua gracilis**	*Muhlenbergia racemosa*	*Thalictrum dasycarpum*
Bromus ciliatus	*Oenothera biennis**	*Vicia americana*
Bromus inermis	*Orobanche fasciculata*	*Viola adunca**
*Bromus porteri**	*Orthocarpus luteus*	*Viola pedatifida*
*Campanula rotundifolia**	*Oxytropis campestris*	*Zizia aptera**
Birds		
American crow	Common yellowthroat	Sharp-tailed grouse
American goldfinch	Eastern kingbird	Song sparrow
American kestrel	Marbled godwit	Swainson's hawk
American robin	Mourning dove	Upland sandpiper
American white pelican	Northern harrier	Vesper sparrow
Black-billed magpie	Red-tailed hawk	Western kingbird
Broad-winged hawk	Sandhill crane	Western meadowlark
Clay-colored sparrow	Savannah sparrow	Whip-poor-will
Mammals		
Coyote	Striped skunk	White-tailed deer
Eastern cottontail	Thirteen-lined ground squirrel	White-tailed jackrabbit
Franklin's ground squirrel		
Amphibians		
Wood frog		
Reptiles		
Western plains garter snake		

Cont'd...

Dragonflies		
Canada darner	Four-spotted skimmer	Variegated meadowhawk
Dot-tailed whiteface	Green darner	
Butterflies		
Common sulphur	Northwestern fritillary	Viceroy
Dreamy dusky wing	Ringlet	Western tailed blue
Monarch	Tiger swallowtail	

Appendix VII

Data summary, Wetland habitat (Transect 5), Alonsa Wildlife Management Area.

Table 44. Mean cover, mean density and frequency of shrub species occurring in transect 5, sampled August 10, 1999 (n = 3 plots, 5 m x 5m).

Species	Mean cover (%)	Mean density (stems/plot)	Mean density (stems/ha)	Frequency (%)
Populus balsamifera	3.33	3.00	1200.00	33.3
Salix exigua	8.33	18.33	7333.33	66.7

Table 45. Mean cover and frequency of herbaceous and low shrub species occurring in transect 5, sampled August 10, 1999 (n = 15 quadrats, 1m x 1m).

Species	Mean cover (%)	Frequency (%)
Carex sp. (>1m tall)	43.70	100.0
Litter	21.07	100.0
Bare Ground	14.30	86.7
Stachys palustris	11.00	100.0
Calamagrostis sp.	7.80	73.3
Phragmites australis	7.37	33.3
Phalaris arundinacea	7.00	73.3
Polygonum sp.	4.23	66.7
Poa palustris	3.73	53.3
Lycopus asper	2.40	26.7
Spartina pectinata	2.00	13.3
Alisma plantago-aquatica	1.90	80.0
Bladderwort?	1.47	33.3
Cirsium sp.	1.43	53.3
Rosa sp.	1.00	6.7
Aster sp. (white)	0.87	40.0
Salix exigua	0.83	33.3
Potomogeton sp.	0.83	33.3
Poa pratensis	0.40	13.3
Lathyrus palustris	0.23	13.3
Populus balsamifera	0.20	6.7
Scirpus sp.	0.20	6.7
Rudbeckia hirta	0.20	6.7
Equisetum sp.	0.13	26.7
Sonchus sp.	0.03	6.7
Artemisia ludoviciana	0.03	6.7
Asclepias sp.	0.03	6.7

Table 46. Number of birds detected per period, average number per period and average number per plot (based on 10 plots) for each species recorded in point count survey transect 3 (5 plots).

Species	Period 1 10-Aug	Period 2 11-Aug	Average (number/period)	Average (number/plot)
Pied-billed grebe	0	1	0.5	0.1
Virginia rail	0	1	0.5	0.1
American coot	1	1	1.0	0.2
Mallard	2	3	2.5	0.5
Blue-winged teal	2	1	1.5	0.3
Green-winged teal	1	1	1.0	0.2
Marbled godwit	0	1	0.5	0.1
Red-tailed hawk	1	0	0.5	0.1
Broad-winged hawk	0	1	0.5	0.1
Mourning dove	2	1	1.5	0.3
American crow	1	0	0.5	0.1
Cedar waxwing	7	6	6.5	1.3
Eastern kingbird	3	9	6.0	1.2
Western kingbird	2	1	1.5	0.3
Sedge wren	3	3	3.0	0.6
Marsh wren	1	5	3.0	0.6
Black-billed cuckoo	0	1	0.5	0.1
Yellow-headed blackbird	3	0	1.5	0.3
Red-winged blackbird	1	0	0.5	0.1
Rusty blackbird	0	1	0.5	0.1
Veery	1	1	1.0	0.2
Canada warbler	1	2	1.5	0.3
Mourning warbler	0	1	0.5	0.1
Le Conte's sparrow	1	0	0.5	0.1
Song sparrow	3	1	2.0	0.4
Totals	36	42	39.0	7.8

Table 47. Number of animals caught per trap night, total number caught and abundance index for each species caught in snap trap transect 3 (50 traps).

Species	Night 1 (10-Aug)	Night 2 (11-Aug)	Night 3 (12-Aug)	Total	Abundance index (n=3 x 50)
Deer mouse	1	1	3	5	0.0335
Southern red-backed vole	0	1	0	1	0.0067
Masked shrew	0	0	1	1	0.0067
Least chipmunk	0	0	1	1	0.0067
13-lined ground squirrel	0	0	1	1	0.0067
Marsh wren	0	0	1	1	0.0067
Totals	1	2	7	10	0.0668

Table 48. List of all species observed in Wetland habitat, Alonsa Wildlife Management Area.

Plants		
Achillea millefolium	*Helianthus laetiflorus*	*Populus balsamifera*
Agoseris glauca	*Hypoxis hirsuta*	*Potamogeton* sp.
Alisma plantago-aquatica	*Juncus balticus*	*Potentilla fruticosa*
Artemisia ludoviciana	*Juncus filiformis*	*Rosa* sp.
Asclepias sp.	*Lathyrus palustris*	*Rudbeckia hirta*
Aster laevis	*Lobelia kalmii*	*Salix exigua*
Aster simplex	*Lycopus asper*	*Scirpus* sp.
Calamagrostis sp.	*Lysimachia ciliata*	*Scutellaria epilobifolia*
Carex lanuginosa	*Panicum liebergii*	*Sium suave*
Carex lasiocarpa	*Panicum virgatum*	*Solidago graminifolia*
Carex tenera	*Pedicularis canadensis*	*Solidago rigida*
Carex tetanica	*Pedicularis lanceolata*	*Sonchus* sp.
Cirsium muticum	*Petasites* x *vitifolius*	*Spartina pectinata*
Deschampsia caespitosa	*Phalaris arundinacea*	*Spiraea alba*
Equisetum hyemale	*Phragmites australis*	*Stachys palustris*
Equisetum sp.	*Poa palustris*	*Triglochin maritima*
Eriophorum angustifolium	*Poa pratensis*	*Utricularia* sp.
Glyceria striata	*Polygonum amphibium*	
Birds		
American coot	Eastern kingbird	Red-winged blackbird
American crow	Eastern Phoebe	Ruddy duck
American goldfinch	Great blue heron	Rusty blackbird
American kestrel	Green-winged teal	Song sparrow
Black-billed cuckoo	Le Conte's sparrow	Sora
Blue-winged teal	Mallard	Virginia rail
Broad-winged hawk	Marbled godwit	Western kingbird
Canada warbler	Mourning dove	Whip-poor-will
Cedar waxwing	Mourning warbler	Yellow-headed blackbird
Common snipe	Red-tailed hawk	
Mammals		
Coyote	Moose	Richardson's ground squirrel
Deer mouse	Muskrat	White-tailed deer
Masked shrew		
Amphibians		
Boreal chorus frog	Wood frog	
Reptiles		
Western plains garter snake		

Cont'd...

Dragonflies		
Canada darner	Ruby meadowhawk	White-faced meadowhawk
Red-veined meadowhawk		
Butterflies		
Common wood nymph	Great spangled fritillary	Northwestern fritillary

Appendix VIII

Data summary for Woodland habitat transects, Alonsa Community Pasture.

Vegetation tables for each transect include mean cover (%) for each herbaceous species, bare ground, lichens and moss, and litter; Density Distribution Class (DDC), median height (m) and estimated cover (%) for each woody species; and a list of incidental species observations for each field.

Table 49. Summary of woodland transect data, Field A1a, Alonsa Community Pasture.

Herbaceous Species	%
Aster ciliolatus	11.1
Rhus radicans	8.7
Lathyrus sp.	6.3
Poa pratensis	6.1
Thalictrum sp.	5.75
Schizachne purpurascens	5.7
Sanicula marilandica	4.8
Medicago lupulina	4
Glycyrrhiza lepidota	3
Fragaria virginiana	2.1
Galium boreale	2.1
Solidago sp.	1.8
Taraxacum officinale	1.8
Achillea millefolium	1.5
Maianthemum canadense	0.9
Smilacina stellata	0.9
Monarda fistulosa	0.65
Vicia americana	0.65
Antennaria neodioica	0.6
Oryzopsis asperifolia	0.6
Polygala senega	0.6
Rudbeckia hirta	0.6
Comandra umbellata	0.35
Melilotus officinalis	0.35
Viola sp.	0.35
Asclepias sp.	0.3
Astragalus sp.	0.3
Bromus ciliatus	0.3
Elymus canadensis	0.3
Solidago rigida	0.3
Zizia sp.	0.3
Total herbaceous	40.5
Bare ground	18.4
Litter	73.25

Woody Species	DDC	Median height (m)	Cover %
Populus tremuloides	8	4.125	60
Salix sp.	5	1.5	15
Populus balsamifera	5	5.5	15
Corylus sp.	5	1.25	15
Amelanchier alnifolia	7	0.625	10
Rosa sp.	7	0.55	10
Symphoricarpos occidentalis	7	0.25	10
Prunus virginiana	2	1.5	<10
Quercus macrocarpa	2	2.25	<10
Betula sp.	2	2	<10

Incidental observations:
Apocynum androsaemifolium

Table 50. Summary of woodland transect data, Field A1d, Alonsa Community Pasture.

Herbaceous Species	%
Thalictrum sp.	8.2
Maianthemum canadense	6.65
Fragaria virginiana	6.35
Rubus pubescens	6.3
grass (incl. *Oryzopsis* and *Poa*)	5.4
Aster ciliolatus	4.55
Sanicula marilandica	4
Zizia sp.	3.7
Carex sp.	2.75
Smilacina stellata	2.1
Galium boreale	1.9
Solidago sp.	1.85
Epilobium angustifolium	1.8
Glycyrrhiza lepidota	1.5
unID orchid sp.	1.5
Vicia sp.	0.7
Anemone sp.	0.6
Viola sp.	0.35
Comandra umbellata	0.3
Heuchera richardsonii	0.3
Polygala senega	0.3
Ribes sp.	0.3
Taraxacum officinale	0.3
unID mint sp.	0.3
Lysimachia ciliata	0.1
Ranunculus sp.	0.1
unID composite sp.	0.1
Astragalus sp.	0.05
Lithospermum canescens	0.05
Petasites sagittatus	0.05
Rhus radicans	0.05
Total herbaceous	42.5
Bare ground	0
Moss and Lichen	0.35
Litter	85

Woody Species	DDC	Median height (m)	Cover %
Populus tremuloides	8	5.25	70
Cornus stolonifera	7	1.5	15
Salix sp.	6	1.75	15
Amelanchier alnifolia	6	1.5	10
Betula sp.	5	1.5	10
Symphoricarpos sp.	8	0.25	10
Elaeagnus commutata	5	1.125	<10
Lonicera dioica	4	1	<10
Potentilla fruticosa	4	0.375	<10
Prunus virginiana	5	1.25	<10
Ribes sp.	2	0.5	<10
Rosa sp.	4	0.5	<10
Shepherdia canadensis	2	0.3	<10
Viburnum opulus	2	2	<10

Incidental observations:
Castilleja miniata
Oryzopsis asperifolia

Table 51. Summary of woodland transect data, Field A2, Alonsa Community Pasture.

Herbaceous Species	%
Poa pratensis	7.15
Oryzopsis asperifolia	4.2
Aster ciliolatus	3.65
Sanicula marilandica	3.6
Taraxacum officinale	3.05
Zizia aurea	3.05
Apocynum androsaemifolium	3
Bromus ciliatus	3
Petasites sagittatus	3
Spiraea alba	3
Rhus radicans	2.4
Rubus pubescens	1.5
Sonchus sp.	1.5
Thalictrum sp.	1.5
Carex sp.	1.05
Maianthemum canadense	1
Fragaria virginiana	0.9
Medicago lupulina	0.65
Vicia americana	0.65
Agropyron trachycaulum	0.6
Galium boreale	0.6
Rudbeckia hirta	0.6
Smilacina stellata	0.6
Bromus inermis	0.3
Lysimachia ciliata	0.3
Solidago sp.	0.3
Polygala senega	0.1
Comandra umbellata	0.05
Monarda fistulosa	0.05
unID composite sp.	0.05
Total herbaceous	31.5
Bare ground	1.95
Moss & Lichen	1.5
Litter	95

Woody Species	DDC	Median height (m)	Cover %
Populus tremuloides	8	10	80
Rosa sp.	7	0.5	20
Symphoricarpos sp.	8	0.5	20
Cornus stolonifera	5	0.75	10
Amelanchier alnifolia	4	1.5	<10
Betula sp.	1	1	<10
Elaeagnus commutata	1	1	<10
Lonicera dioica	2	1	<10
Populus balsamifera	3	12	<10
Prunus virginiana	2	1.25	<10
Ribes sp.	2	0.1	<10
Rubus idaeus	3	0.375	<10
Salix sp.	2	1	<10
Viburnum opulus	1	0.5	<10

Table 52. Summary of woodland transect data, Field A2b, Alonsa Community Pasture.

Herbaceous Species	%	Woody Species	DDC	Median height (m)	Cover %
Poa pratensis	29.8	*Populus tremuloides*	8	7.5	60
Carex sp.	5.4	*Symphoricarpos* sp.	7	0.5	20
Rubus pubescens	4.8	*Cornus stolonifera*	4	0.5	10
Lysimachia ciliata	3.95	*Corylus cornuta*	5	1.5	5
Fragaria virginiana	3.65	*Rosa* sp.	7	0.25	5
Aster ciliolatus	1.55	*Betula* sp.	3	2	<5
Agrostis stolonifera	1.5	*Prunus virginiana*	4	1.75	<5
Taraxacum officinale	1.4	*Ribes* sp.	2	0.375	<5
Zizia aurea	1.25	*Salix exigua*	3	1.5	<5
Thalictrum sp.	1	*Salix* sp.	2	2	<5
Galium boreale	0.75	*Spiraea alba*	1	0.25	<5
Viola sp.	0.65				
Aster sp.	0.6				
Maianthemum canadense	0.35	Incidental observations:			
Ranunculus sp.	0.35	*Petasites sagittatus*			
Asclepias sp.	0.3	*Rhus radicans*			
Epilobium angustifolium	0.3	*Smilacina stellata*			
Vicia americana	0.15				
Achillea millefolium	0.05				
Agoseris glauca	0.05				
Comandra umbellata	0.05				
Juncus balticus	0.05				
Rudbeckia hirta	0.05				
Sisyrinchium montanum	0.05				
Sonchus sp.	0.05				
Total herbaceous	52.25				
Bare ground	14.7				
Moss and Lichen	0.65				
Litter	66.5				

Table 53. Summary of woodland transect data, Field A2c, Alonsa Community Pasture.

Herbaceous Species	%
Poa sp.	12.45
Carex sp.	4.2
Maianthemum canadense	1.5
Agropyron sp.	0.9
Galium boreale	0.85
Aster ciliolatus	0.65
Fragaria virginiana	0.6
Taraxacum officinale	0.55
Thalictrum sp.	0.35
Apocynum androsaemifolium	0.3
Comandra umbellata	0.3
Epilobium angustifolium	0.3
Lathyrus sp.	0.3
Lysimachia ciliata	0.3
Sonchus sp.	0.3
UnID forb	0.3
Medicago lupulina	0.05
Polygala senega	0.05
Smilacina stellata	0.05
Vicia americana	0.05
Viola sp.	0.05
Total herbaceous	25.05
Bare ground	8.1
Litter	93.75

Woody Species	DDC	Median height (m)	Cover %
Populus tremuloides	8	6	50
Rosa sp.	8	0.5	50
Symphoricarpos sp.	8	0.75	50
Populus balsamifera	5	11	10
Salix sp.	2	0.75	10
Amelanchier alnifolia	2	1	<10
Cornus stolonifera	2	1.5	<10
Corylus americana	3	1.5	<10
Quercus macrocarpa	2	0.5	<10
Ribes sp.	1	0.25	<10

Incidental observations:
Rhus radicans
Rubus pubescens
Schizachne purpurascens

Table 54. Summary of woodland transect data, Field A2d, Alonsa Community Pasture.

Herbaceous Species	%	Woody Species	DDC	Median height (m)	Cover %
Poa sp.	22.75	*Populus tremuloides*	8	6	60
Carex sp.	5.15	*Amelanchier alnifolia*	7	0.25	10
Fragaria virginiana	4.85	*Rosa* sp.	8	0.3	10
Aster ciliolatus	4.5	*Cornus stolonifera*	5	0.5	<10
Melilotus officinalis/alba	3.3	*Corylus* sp.	3	1	<10
Taraxacum officinale	1.6	*Prunus virginiana*	1	0.5	<10
Glycyrrhiza lepidota	1.5	*Salix* sp.	2	2.75	<10
Medicago lupulina	1.5	*Symphoricarpos* sp.	8	0.25	<10
Rhus radicans	1.5	*Viburnum opulus*	1	0.25	<10
Rudbeckia hirta	1.5	*Viburnum rafinesquianum*	2	1	<10
Galium boreale	1				
Solidago sp.	0.6				
UnID *Aster* sp.	0.6	Incidental observations:			
UnID grass sp.	0.45	*Hieracium canadense*			
Sonchus sp.	0.35	*Petasites sagitattus*			
Vicia sp.	0.35	*Plantago major*			
Achillea millefolium	0.3				
Anemone sp.	0.3				
Schizachne purpurascens	0.3				
Viola sp.	0.3				
Zizia aurea	0.3				
Thalictrum sp.	0.15				
Sanicula marilandica	0.1				
Comandra umbellata	0.05				
Lactuca sp.	0.05				
Lysimachia ciliata	0.05				
Maianthemum canadense	0.05				
Total herbaceous	50.25				
Bare ground	6.6				
Moss and Lichen	0.05				
Litter	82.75				

Table 55. Summary of woodland transect data, Field A2f, Alonsa Community Pasture.

Herbaceous Species	%	Woody Species	DDC	Median height (m)	Cover %
Poa sp.	40.25	*Populus tremuloides*	8	6	60
Taraxacum officinale	12.45	*Populus balsamifera*	5	10	20
Carex sp.	11.25	*Cornus stolonifera*	4	1	10
Aster ciliolatus	6.4	*Corylus cornuta*	5	2	10
Fragaria virginiana	3.95	*Ribes* sp.	2	0.05	<10
Zizia sp.	3.6	*Rosa* sp.	7	0.75	<10
Sonchus sp.	3	*Shepherdia canadensis*	1	0.5	<10
Medicago lupulina	2.8	*Symphoricarpos* sp.	7	3.75	<10
Vicia sp.	2.4				
Sanicula marilandica	2.1				
Phleum pratense	1.8	Incidental observations:			
Plantago major	1.55	*Mentha arvensis*			
Cirsium arvense	1.5	*Schizachne purpurascens*			
Solidago sp.	1.25				
Viola sp.	0.95				
Lysimachia ciliata	0.9				
Smilacina stellata	0.65				
Thalictrum sp.	0.6				
Melilotus officinalis/alba	0.35				
Comandra umbellata	0.3				
Galium triflorum	0.3				
Petasites sagittatus	0.3				
Rubus pubescens	0.3				
Trifolium sp.	0.3				
Galium boreale	0.1				
Oryzopsis asperifolia	0.1				
Rhus radicans	0.1				
Total herbaceous	75.8				
Bare ground	1				
Litter	84				

Table 56. Summary of woodland transect data, Field A3b, Alonsa Community Pasture.

Herbaceous Species	%	Woody Species	DDC	Median height (m)	Cover %
Poa pratensis	22.4	*Populus tremuloides*	8	5	60
Fragaria virginiana	14.9	*Corylus americana*	6	1.25	20
Sanicula marilandica	8.15	*Cornus stolonifera*	6	0.75	15
Aster ciliolatus	8.1	*Amelanchier alnifolia*	7	1.5	10
Thalictrum sp.	7	*Rosa* sp.	8	0.75	10
Schizachne purpurascens	5.4	*Salix* sp.	4	2	10
Smilacina stellata	3.65	*Betula* sp.	2	1	<10
Rhus radicans	3.6	*Lonicera dioica*	1	1	<10
Maianthemum canadense	3.3	*Prunus* sp.	1	1.5	<10
Taraxacum officinale	2.7	*Ribes* sp.	1	0.5	<10
Viola renifolia	2.45	*Symphoricarpos* sp.	7	0.75	<10
Zizia spp.	2.45	*Viburnum lentago*	1	0.5	<10
Agropyron sp.	2.1	*Viburnum opulus*	2	1.5	<10
Aralia nudicaulis	1.8	*Viburnum rafinesquianum*	4	1	<10
Galium boreale	1.05				
Rubus pubescens	0.7				
Lathyrus sp.	0.65	Incidental observations:			
Bromus ciliatus	0.6	*Actaea rubra*			
Carex sp.	0.6	*Apocynum androsaemifolium*			
Polygala senega	0.6	*Crataegus sp.*			
Solidago sp.	0.6	*Melilotus alba*			
Comandra umbellata	0.3	*Populus balsamifera*			
Elymus canadensis	0.3	*Prunus virginiana*			
Heiracium sp.	0.3	*Solidago hispida*			
Lysimachia ciliata	0.3				
Vicia americiana	0.3				
Viola sp.	0.3				
Lathyrus (tuberosus)	0.1				
Lithospermum canescens	0.05				
Medicago lupulina	0.05				
Sisyrinchium montanum	0.05				
Total herbaceous	68.75				
Bare ground	1				
Moss and Lichens	0.9				
Litter	89				

Table 57. Summary of woodland transect data, Field A4, Alonsa Community Pasture.

Herbaceous Species	%	Woody Species	DDC	Median height (m)	Cover %
Poa pratensis	19.5	*Populus tremuloides*	8	5	70
Grass spp.	13.4	*Rosa* sp.	8	0.5	30
Fragaria virginiana	12.6	*Cornus stolonifera*	4	0.75	20
Taraxacum officinale	8.15	*Corylus* sp.	5	1.25	10
Carex sp.	5.85	*Symphoricarpos* sp.	7	0.175	10
Lysimachia ciliata	4.65	*Betula* sp.	2	0.5	<10
Aster ciliolatus	4.5	*Quercus macrocarpa*	2	0.75	<10
Anemone canadensis	4.05	*Ribes* sp.	2	0.25	<10
Glycyrrhiza lepidota	3.75	*Viburnum opulus*	2	0.5	<10
Thalictrum sp.	3.6				
Rubus pubescens	3.3				
Sanicula marilandica	3.3	Incidental observations:			
Rhus radicans	3	*Antennaria neodioica*			
Solidago sp.	2.7	*Bromus ciliatus*			
Zizia aurea	1.85	*Geranium bicknellii*			
Galium boreale	1.5	*Petasites sagittatus*			
Phleum pratense	1.5	*Smilax lasioneura*			
Rudbeckia hirta	1.5				
UnID grass sp.	1.5				
Lathyrus sp.	0.95				
Vicia americana	0.95				
Maianthemum canadense	0.9				
Oryzopsis asperifolia	0.65				
Smilacina stellata	0.65				
Sonchus sp.	0.6				
Lycopus asper	0.35				
Astragalus sp.	0.3				
Comandra umbellata	0.3				
Lithospermum canescens	0.3				
Medicago lupulina	0.3				
Polygala senega	0.3				
Achillea millefolium	0.25				
Juncus sp.	0.05				
Total herbaceous	76				
Bare ground	17.1				
Litter	52.5				

Table 58. Summary of woodland transect data, Field A4g, Alonsa Community Pasture.

Herbaceous Species	%	Woody Species	DDC	Median height (m)	Cover %
Poa pratensis	10.2	*Populus tremuloides*	8	8.5	60
Medicago lupulina	5.75	*Populus balsamifera*	5	6	10
Rhus radicans	4.8	*Rosa* sp.	7	0.75	10
Fragaria virginiana	3.9	*Salix* sp.	2	1.5	10
Aster ciliolatus	3	*Symphoricarpos* sp.	8	0.25	10
Taraxacum officinale	2.1	*Amelanchier alnifolia*	2	1	<10
Rubus pubescens	1.5	*Cornus stolonifera*	5	1.25	<10
Thalictrum sp.	1.5	*Elaeagnus commutata*	5	1.25	<10
Schizachne purpurascens	0.9	*Ribes* sp.	2	0.25	<10
Solidago sp.	0.9	*Rubus idaeus*	6	0.75	<10
Maianthemum canadense	0.3	*Shepherdia canadensis*	3	1	<10
Melilotus officinalis/alba	0.3				
Smilacina stellata	0.3				
Galium boreale	0.1	Incidental observations:			
Lathyrus sp.	0.1	*Viburnum lentago*			
Total herbaceous	19.5				
Bare ground	2.5				
Litter	87.5				

Table 59. Summary of woodland transect data, Field B2, Alonsa Community Pasture.

Herbaceous Species	%	Woody Species	DDC	Median height (m)	Cover %
Poa pratensis	15.2	*Populus tremuloides*	8	5.5	60
Agrostis stolonifera	9.35	*Populus balsamifera*	4	2	20
Taraxacum officinale	6.6	*Symphoricarpos sp.*	8	0.5	20
Carex sp.	5.7	*Rosa* sp.	6	0.75	15
Maianthemum canadense	3.9	*Amelanchier alnifolia*	5	2	10
Aster ciliolatus	3.6	*Cornus stolonifera*	7	0.875	10
Lathyrus sp.	2.4	*Corylus* sp.	5	1.25	10
Trifolium sp.	2.25	*Prunus virginiana*	5	0.5	<10
Galium boreale	2.1	*Quercus macrocarpa*	2	0.5	<10
Fragaria virginiana	1.8	*Ribes* sp.	2	0.5	<10
Achillea millefolium	0.6	*Salix exigua*	2	0.5	<10
Rhus radicans	0.6	*Salix* sp.	4	1.5	<10
Anemone sp.	0.3	*Shepherdia canadensis*	4	1	<10
Comandra umbellata	0.3	*Viburnum rafinesquianum*	2	1.5	<10
Juncus sp.	0.3				
Oryzopsis asperifolia	0.3				
Pyrola sp.	0.3	Incidental observations:			
Sanicula marilandica	0.3	*Aster ciliolatus*			
Solidago sp.	0.3	*Bromus inermis*			
unID composite sp.	0.3	*Equisetum sp.*			
Vicia sp.	0.3	*Erigeron philadelphicus*			
Viola sp.	0.3	*Glycyrrhiza lepidota*			
Cerastium sp.	0.05	*Pyrola virens*			
Lithospermum canescens	0.05	*Rubus idaeus*			
Medicago lupulina	0.05	*Rudbeckia hirta*			
Smilacina stellata	0.05	*Salix lutea*			
Thalictrum sp.	0.05				
Total herbaceous	48.55				
Bare ground	5.15				
Moss and Lichens	0.3				
Litter	78.25				

Table 60. Summary of woodland transect data, Field B2b, Alonsa Community Pasture.

Herbaceous Species	%
Poa pratensis	50
Phleum pratense	9.6
Taraxacum officinale	6.9
Agrostis stolonifera	5.1
Aster ciliolatus	4.5
Solidago sp.	4.5
Fragaria virginiana	3.9
Carex sp.	1.8
Medicago lupulina	1.25
Lysimachia ciliata	1.2
Agropyron sp.	0.9
Vicia sp.	0.9
Aster laevis	0.6
Melilotus officinalis/alba	0.6
Viola sp.	0.6
Anemone canadensis	0.3
Maianthemum canadense	0.3
Sonchus sp.	0.3
Thalictrum sp.	0.3
Trifolium sp.	0.3
Zizia sp.	0.3
Achillea millefolium	0.1
Asclepias sp.	0.05
Equisetum sp.	0.05
Galium boreale	0.05
Plantago major	0.05
Total herbaceous	75.75
Bare ground	10.05
Litter	66.5

Woody Species	DDC	Median height (m)	Cover %
Populus tremuloides	7	7	50
Cornus stolonifera	4	1.5	15
Rosa sp.	7	0.5	15
Symphoricarpos sp.	7	0.375	15
Amelanchier alnifolia	2	0.25	<10
Populus balsamifera	2	1	<10
Potentilla fruticosa	2	0.625	<10
Ribes sp.	2	0.5	<10
Salix sp.	3	1.5	<10

Incidental observations:
Antennaria neodioica

Table 61. Summary of woodland transect data, Field B2c, Alonsa Community Pasture.

Herbaceous Species	%	Woody Species	DDC	Median height (m)	Cover %
Fragaria virginiana	12.3	*Populus tremuloides*	8	6	60
Poa pratensis	10.05	*Rosa* sp.	8	0.25	25
Taraxacum officinale	6.6	*Salix* sp.	5	2	25
Zizia sp.	5.4	*Viburnum opulus*	6	2.5	25
Glycyrrhiza lepidota	5.25	*Cornus stolonifera*	5	0.75	20
Sanicula marilandica	4.8	*Symphoricarpos* sp.	8	0.25	20
Aster sp.	3.6	*Amelanchier alnifolia*	4	0.75	<10
Maianthemum canadense	3.6	*Viburnum lentago*	6	0.25	<10
Rhus radicans	3.3				
Rubus pubescens	3.3				
Thalictrum sp.	3.3	Incidental observations:			
Aster ciliolatus	1.8	*Bromus ciliatus*			
Asclepias sp.	1.5	*Petasites sagittatus*			
Schizachne purpurascens	1.2				
Carex sp.	0.95				
Vicia sp.	0.7				
Lactuca sp.	0.6				
Lysimachia ciliata	0.6				
Smilacina stellata	0.6				
Galium boreale	0.45				
Anemone canadensis	0.35				
Achillea millefolium	0.3				
Comandra umbellata	0.3				
Total herbaceous	40.5				
Bare ground	2.25				
Moss and Lichens	0.9				
Litter	88.75				

Table 62. Number of birds detected per period, average number per period and average number per plot (based on 10 plots) for each species recorded in point count survey transect 1, field A3b (10 plots).

Species	27-Jul	28-Jul	(number/period)	(number/plot)
Mourning dove	1	2	1.50	0.15
Hairy woodpecker	3	1	2.00	0.20
American robin	2	3	2.50	0.25
American crow	4	3	3.50	0.35
Blue jay	0	2	1.00	0.10
Yellow-bellied sapsucker	2	3	2.50	0.25
Cedar waxwing	2	0	1.00	0.10
Eastern wood-pewee	0	1	0.50	0.05
Least flycatcher	3	0	1.50	0.15
Eastern phoebe	1	4	2.50	0.25
Eastern kingbird	0	2	1.00	0.10
Western kingbird	1	1	1.00	0.10
Rose-breasted grosbeak	0	1	0.50	0.05
Wood thrush	2	4	3.00	0.30
Ovenbird	0	1	0.50	0.05
Solitary vireo	1	1	1.00	0.10
Red-eyed vireo	2	1	1.50	0.15
Tennessee warbler	1	0	0.50	0.05
American redstart	1	1	1.00	0.10
White-throated sparrow	3	2	2.50	0.25
Song sparrow	0	1	0.50	0.05
Totals	29	34	31.50	3.15

Table 63. Number of animals caught per trap night, total number caught and abundance index for each species caught in snap trap transect 1, field A3b (25 traps).

Species	Trap night				Abundance index
	1(27-Jul)	2 (28-Jul)	3 (29-Jul)	Total	(n=3 x 25)
Deer mouse	0	0	2	2	0.0267
Totals	0	0	2	2	0.0267

Table 64. List of all species observed in Woodland habitat, Alonsa Community Pasture.

Plants		
Achillea millefolium	*Erigeron philadelphicus*	*Quercus macrocarpa*
Actaea rubra	*Fragaria virginiana*	*Ranunculus* sp.
Agoseris glauca	*Galium boreale*	*Rhus radicans*
Agropyron sp.	*Galium triflorum*	*Ribes* sp.
Agropyron trachycaulum	*Geranium bicknellii*	*Rosa* sp.
Agrostis stolonifera	*Glycyrrhiza lepidota*	*Rubus idaeus*
Amelanchier alnifolia	*Heuchera richardsonii*	*Rubus pubescens*
Anemone canadensis	*Hieracium canadense*	*Rudbeckia hirta*
Anemone sp.	*Juncus balticus*	*Salix (lutea)*
Antennaria neodioica	*Juncus* sp.	*Salix exigua*
Apocynum androsaemifolium	*Lactuca* sp.	*Salix* spp.
Aralia nudicaulis	*Lathyrus* sp.	*Sanicula marilandica*
Artemisia sp.	*Lathyrus tuberosus*	*Schizachne purpurascens*
Asclepias sp.	*Lithospermum canescens*	*Shepherdia canadensis*
Aster ciliolatus	*Lonicera dioica*	*Sisyrinchium montanum*
Aster laevis	*Lycopus asper*	*Smilacina stellata*
Aster sp.	*Lysimachia ciliata*	*Smilax lasioneura*
Astragalus sp.	*Maianthemum canadense*	*Solidago hispida*
Betula sp.	*Medicago lupulina*	*Solidago rigida*
Bromus ciliatus	*Melilotus alba*	*Sonchus* sp.
Bromus inermis	*Melilotus officinalis*	*Spiraea alba*
Carex sp.	*Mentha arvensis*	*Symphoricarpos* sp.
Castilleja miniata	*Monarda fistulosa*	*Symphoricarpos occidentalis*
Cerastium sp.	*Oryzopsis asperifolia*	*Taraxacum officinale*
Cirsium arvense	*Petasites sagitattus*	*Thalictrum* sp.
Comandra umbellata	*Phleum pratense*	*Trifolium* sp.
Cornus canadensis	*Plantago major*	*Viburnum lentago*
Cornus stolonifera	*Poa pratensis*	*Viburnum opulus*
Corylus americana	*Polygala senega*	*Viburnum rafinesquianum*
Corylus cornuta	*Populus balsamifera*	*Vicia americana*
Crataegus sp.	*Populus tremuloides*	*Viola renifolia*
Elaeagnus commutata	*Potentilla fruticosa*	*Viola* sp.
Elymus canadensis	*Prunus virginiana*	*Zizia aurea*
Epilobium angustifolium	*Pyrola virens*	*Zizia aptera*
Equisetum sp.		

Cont'd...

Birds		
Alder flycatcher	Eastern phoebe	Red-tailed hawk
American crow	Eastern wood-peewee	Rose-breasted grosbeak
American goldfinch	Hairy woodpecker	Solitary vireo
American redstart	Horned lark	Song sparrow
American robin	Least flycatcher	Tennessee warbler
Black-capped chickadee	Mourning dove	Western kingbird
Blue Jay	Northern flicker	Whip-poor-will
Cedar waxwing	Ovenbird	White-throated sparrow
Common nighthawk	Philadelphia vireo	Wood thrush
Eastern bluebird	Red-eyed vireo	Yellow-bellied sapsucker
Eastern kingbird		
Mammals		
Coyote	Richardson's ground squirrel	White-tailed deer
Deer mouse		
Butterflies		
Common wood nymph	Great spangled fritillary	Ringlet

Appendix IX

Data summary for Grassland habitat transects, Alonsa Community Pasture.

Table 65 (a) to (aa). Mean estimated biomass (% of total) for each species with biomass > 5% in at least one quadrat on the transect, as well as mean total herbaceous cover (%), mean bare ground cover (%), mean litter cover (%) and incidental species observations for each grassland transect. (Tr = trace, less than 0.5% mean biomass.)

(a) Transect A1

Species	%
Poa pratensis	54
Agropyron sp.	10.5
Solidago sp.	5.5
Phleum pratense	3
Solidago rigida	3
Artemisia absinthium	3
Carex spp.	2
Poa compressa	2
Plantago major	1.5
Medicago lupulina	1
Taraxacum officinale	1
Sisyrinchium montanum	0.5
Cirsium arvense	0.5
Hieracium sp.	0.5
Melilotus officinalis	0.5
Fragaria virginiana	Tr
Rudbeckia hirta	Tr
Lithospermum canescens	Tr
Polygala senega	Tr
Thalictrum sp.	Tr
Sonchus arvensis	Tr
Smilax lasioneura	Tr
Cypripedium calceolus	Tr
Aster laevis	Tr
Glycyrrhiza lepidota	Tr
Achillea millefolium	Tr
Comandra umbellata	Tr
Erigeron sp.	Tr
Total herbaceous	71.3
Bare ground	10.2
Litter	40.3

Incidental observations:
Bromus ?porteri, Carex lanuginosa, Elymus sp., *Juncus nodosus, Juncus tenuis, Lobelia spicata, Panicum capillare, Phalaris arundinacea*

(b) Transect A1a

Species	%
Poa pratensis	45
Carex sp.	7
Danthonia spicata	5
Solidago rigida	5
Aster laevis	4
Solidago sp.	4
Antennaria neodioica	3
Agropyron trachycaulum	3
Juncus (balticus)	2
Agrostis stolonifera	2
Juncus sp. (tufted)	1.5
Galium boreale	1
Achillea millefolium	0.5
Fragaria virginiana	0.5
Aster ptarmicoides	0.5
Erigeron sp.	0.5
Aster ericoides	0.5
Cirsium (vulgare)	0.5
Asclepias sp.	Tr
Vicia americana	Tr
Apocynum androsaemifolium	Tr
Lithospermum canescens	Tr
Orthocarpus luteus	Tr
Rudbeckia hirta	Tr
Comandra umbellata	Tr
Anemone canadensis	Tr
Sisyrinchium montanum	Tr
Zizia aptera	Tr
(*Hieracium* sp.)	Tr
Medicago lupulina	Tr
Polygala senega	Tr
Total herbaceous	62
Bare ground	10
Litter	34

Incidental observations:
Agrostis hyemalis, Andropogon gerardii, Andropogon scoparius, Campanula rotundifolia, Cypripedium calceolus, Gentiana affinis, Grindelia squarrosa, Juncus nodosus, Liatris ligulistylis, Monarda fistulosa

(c) Transect A1c

Species	%
Poa pratensis	25.5
Muhlenbergia asperifolia	14.5
Andropogon gerardii	13.5
Carex sp. (tall, thin)	5
Agrostis stolonifera	3.5
Juncus sp.	3
Carex spp.	3
Phleum pratense	3
Hordeum jubatum	2.5
Aster laevis	2
Agropyron sp.	2
Viola sp.	2
Glycyrrhiza lepidota	2
Melilotus alba	1.5
Danthonia spicata	1.5
Rudbeckia hirta	1
unID grass(*Calamagrostis*)	1
unID grass (*Agropyron*)	1
Prunella vulgaris	1
Solidago rigida	1
Thalictrum sp.	0.5
Lobelia spicata	0.5
Taraxacum officinale	Tr
Achillea millefolium	Tr
Sisyrinchium montanum	Tr
Galium boreale	Tr
Smilacina stellata	Tr
Solidago sp.	Tr
Aster ericoides	Tr
Medicago lupulina	Tr
Aster ciliolatus	Tr
Fragaria virginiana	Tr
Total herbaceous	79.5
Bare ground	3.45
Litter	66.8

Incidental observations:
Andropogon scoparius, Calamagrostis sp., Dalea candida, Dalea purpurea, Hierochlöe odorata

(d) Transect A1d

Species	%
Agrostis stolonifera	32
Poa sp.	13
Danthonia spicata	10
unID Composite spp.	8
Bromus inermis	7
Carex spp.	5
Aster laevis	3.5
Juncus sp.	3.5
Solidago sp.	2.5
Agropyron sp.	2
Potentilla anserina	2
unID mint-like sp.	1
Solidago rigida	1
Smilacina stellata	1
Viola sp.	0.5
Antennaria sp.	0.5
Taraxacum officinale	0.5
Cirsium sp.	0.5
Sisyrinchium montanum	Tr
Galium boreale	Tr
Achillea millefolium	Tr
Comandra umbellata	Tr
Carex aurea	Tr
Thalictrum sp.	Tr
Rudbeckia hirta	Tr
Total herbaceous	62
Bare ground	24
Litter	16

Incidental observations:
Agropyron smithii, Castilleja miniata, Juncus longistylis, Prunella vulgaris, Tofieldia glutinosa, Zigadenus elegans

(e) Transect A2

Species	%
Poa pratensis	44
Carex sp.	9.5
Taraxacum officinale	7.5
Agrostis stolonifera	7.5
Muhlenbergia asperifolia	7
Potentilla anserina	7
Sonchus sp.	5
Aster ericoides	3
Medicago lupulina	2.5
Antennaria parvifolia	1.5
Stachys palustris	1
Melilotus officinalis	0.5
Viola adunca	0.5
unID comp. (pinn. Lobed lvs.)	0.5
Cirsium (vulgare)	Tr
Lepidium densiflorum	Tr
Total herbaceous	78.3
Bare ground	5.85
Litter	47.8

Incidental observations:
Cirsium flodmanii, Erigeron strigosus

(f) Transect A2a

Species	%
Poa sp.	35
Carex sp.	21.5
Potentilla anserina	13.5
unID pinnate*(Artemisia)*	10
Aster ericoides	7
Panicum lanuginosum	4
Agropyron sp.	2.5
Solidago sp.	2
Muhlenbergia asperifolia	2
Calamagrostis sp.	1
Galium boreale	0.5
Stachys palustris	0.5
Total herbaceous	36
Bare ground	46.6
Litter	32.5

Incidental observations:
Agropyron trachycaulum, Agrostis stolonifera, Aster ptarmicoides, Aster simplex, Brassica kaber, Bromus inermis, Calamagrostis canadensis, Calamagrostis neglecta, Campanula rotundifolia, Helianthus maximiliani, Lobelia kalmii, Muhlenbergia richardsonis, Poa compressa, Sisyrinchium montanum, Solidago graminifolia

(g) Transect A2b

Species	%
Poa sp.	50
Danthonia spicata	13
Agropyron sp.	10
Phleum pratense	8
Poa compressa	5.5
Medicago lupulina	3.5
Carex sp.	3
Glycyrrhiza lepidota	1
Solidago sp.	0.5
Cirsium sp.	0.5
Antennaria sp.	0.5
Trifolium repens	0.5
Comandra umbellata	Tr
Galium boreale	Tr
Aster laevis	Tr
Aster sp.	Tr
Sisyrinchium montanum	Tr
Taraxacum officinale	Tr
Sonchus sp.	Tr
Achillea millefolium	Tr
Viola sp.	Tr
Helianthus sp.	Tr
Ranunculus sp.	Tr
Total herbaceous	53
Bare ground	24
Litter	22

Incidental observations:
None

(h) Transect A2c

Species	%
Poa pratensis	48
Agropyron trachycaulum	18
Carex sp.	12.5
Taraxacum officinale	5
Antennaria neodioica	3
Phleum pratense	2
Glycyrrhiza lepidota	1.5
Danthonia spicata	1.5
Agrostis stolonifera	1
Melilotus officinalis	1
Solidago sp.	1
Rudbeckia hirta	0.5
Ranunculus sp.	0.5
Aster sp.	0.5
Bromus inermis	0.5
Aster laevis	0.5
Plantago major	Tr
Grindelia squarrosa	Tr
Sonchus sp.	Tr
Juncus sp.	Tr
Comandra umbellata	Tr
Galium boreale	Tr
Total herbaceous	59.5
Bare ground	24.4
Litter	38

Incidental observations:
Achillea millefolium, Aster ciliolatus, Aster ptarmicoides, Campanula rotundifolia, Cirsium flodmanii, Liatris ligulistylis, Potentilla fruticosa, Solidago rigida

(i) Transect A2d

Species	%
Poa sp.	49
Carex sp.	14.5
Hordeum jubatum	8
Fragaria virginiana	4
Medicago lupulina	2.5
Spartina pectinata	2.5
Rudbeckia hirta	2
Anemone canadensis	2
Agrostis hyemalis	2
Phleum pratense	2
Juncus sp.	1.5
Agropyron sp.	1.5
Aster ciliolatus	1
Taraxacum officinale	1
Lysimachia ciliata	1
Bromus ciliatus	1
Galium boreale	0.5
Stachys palustris	0.5
Cirsium arvense	0.5
Apocynum cannabinum	0.5
Melilotus officinalis	0.5
Muhlenbergia richardsonis	0.5
Bromus inermis	0.5
Viola sp.	Tr
Polygala senega	Tr
Asclepias sp.	Tr
Plantago major	Tr
Total herbaceous	77
Bare ground	13.7
Litter	42.8

Incidental observations:
Achillea millefolium, Carex viridula, Cirsium flodmanii (white), *Juncus bufonius, Muhlenbergia glomerata*

(j) Transect A2e

Species	%
Agrostis stolonifera	33
Poa sp.	23
Carex sp.	20
Agropyron sp.	6.5
Bromus inermis	5.5
Medicago lupulina	3
Melilotus officinalis/alba	1.5
Galium boreale	1
Hordeum jubatum	1
Viola sp.	0.5
Juncus sp.	0.5
Cirsium (vulgare)	0.5
Phleum pratense	0.5
Fragaria virginiana	0.5
Muhlenbergia asperifolia	0.5
Sisyrinchium montanum	Tr
Achillea millefolium	Tr
Campanula rotundifolia	Tr
Lycopus asper	Tr
Comandra umbellata	Tr
Potentilla anserina	Tr
Lobelia spicata	Tr
Total herbaceous	88
Bare ground	22
Litter	20

Incidental observations:
Andropogon scoparius, Aster laevis, Aster simplex, Astragalus canadense, Cirsium flodmanii, Gentiana affinis, Glycyrrhiza lepidota, Liatris ligulistylis, Lilium philadelphicum, Lysimachia ciliata, Parnassia (multiseta), Potentilla fruticosa, Rudbeckia hirta, Solidago rigida, Sonchus arvensis

(k) Transect A2f

Species	%
Poa sp.	49
Medicago lupulina	11
Taraxacum officinale	9.5
Agrostis stolonifera	7.5
Sonchus sp.	3.5
Potentilla anserina	3
Carex (tufted)	2.5
Carex sp. (tall)	2
Agropyron sp.	1.5
Glyceria striata	1.5
Cirsium sp.	1
Viola sp.	1
Aster ericoides	1
Carex (aurea)	1
Phleum pratense	1
Melilotus officinalis	1
Rudbeckia hirta	0.5
Juncus sp.	0.5
Cirsium sp. (*vulgare*)	0.5
Stachys palustris	Tr
Galium boreale	Tr
Lysimachia ciliata	Tr
Mentha arvensis	Tr
Thalictrum sp.	Tr
Antennaria parvifolia	Tr
Total herbaceous	80.5
Bare ground	2.25
Litter	54.8

Incidental observations:
None.

(l) Transect A3

Species	%
Poa sp.	21.5
Carex sp.	17
Agropyron sp.	16.5
Medicago lupulina	10.5
Taraxacum officinale	8.5
Antennaria parvifolia	6.5
Vicia americana	3.5
Phleum pratense	2.5
Lathyrus sp.	2.5
Sonchus sp.	2
Galium boreale	1
Juncus (longistylis)	1
Viola sp.	1
Juncus balticus	1
Comandra umbellata	0.5
Fragaria virginiana	0.5
Achillea millefolium	0.5
Antennaria neodioica	0.5
Aster sp.	0.5
Melilotus officinalis	0.5
Aster ericoides	Tr
Total herbaceous	71.1
Bare ground	16.1
Litter	13.7

Incidental observations:
Ranunculus cymbalaria, Trifolium repens

(m) Transect A3a

Species	%
Poa pratensis	38
Phleum pratense	9.5
Panicum lanuginosum	7.5
Carex sp. (small)	4
Melilotus officinalis	2
unID grass (nodding)	1.5
Rudbeckia hirta	1.5
Zigadenus elegans	1.5
Anemone canadensis	1.5
Ranunculus sp.	1.5
unID grass (spike)	1.5
Danthonia spicata	1
Fragaria virginiana	1
Medicago lupulina	1
Galium boreale	1
Antennaria neodioica	1
Achillea millefolium	1
Agrostis stolonifera	1
Hierochlöe odorata	1
Thalictrum sp.	0.5
Viola sp.	0.5
Solidago sp.	0.5
Comandra umbellata	0.5
Lysimachia ciliata	0.5
Vicia americana	Tr
Prenanthes sp.	Tr
Agrostis hyemalis	Tr
Lilium philadelphicum	Tr
Smilacina stellata	Tr
Maianthemum canadense	Tr
Astragalus sp.	Tr
Apocynum cannabinum	Tr
Juncus balticus	Tr
Lathyrus sp.	Tr
Sisyrinchium montanum	Tr
Antennaria parvifolia	Tr
Taraxacum officinale	Tr
Total herbaceous	73
Bare ground	11
Litter	35

Incidental observations:
Agoseris glauca, Aster ciliolatus, Bromus ciliatus, Calamagrostis neglecta, Campanula rotundifolia, Cirsium flodmanii, Elymus sp., *Erigeron acris, E. glabellus, Helictotrichon hookeri, Lactuca tatarica, Liatris ligulistylis, Mentha arvensis, Muhlenbergia* sp., *Polygala senega, Solidago canadensis, S. graminifolia, Zizia aurea*

(n) Transect A3b

Species	%
Poa pratensis	42.5
Agrostis stolonifera	9
Juncus spp.	5.5
Carex sp.	5
Medicago lupulina	3.5
Agropyron trachycaulum	3.5
Plantago major	3
Beckmannia syzigachne	2
Aster ciliolatus	1.5
Taraxacum officinale	1.5
Petasites sagittatus	1.5
Phleum pratense	1
Smilacina stellata	1
Sium suave	1
Scirpus sp. (little)	1
Thalictrum sp.	0.5
Zizia aurea	0.5
Zizia aptera	0.5
Anemone canadensis	0.5
Triglochin maritima	0.5
Alisma plantago-aquatica	0.5
Glyceria striata	0.5
Hierochlöe odorata	0.5
Trifolium repens	Tr
Viola (adunca)	Tr
Galium boreale	Tr
Fragaria virginiana	Tr
Lysimachia ciliata	Tr
Solidago sp.	Tr
Hordeum jubatum	Tr
Sisyrinchium montanum	Tr
Total herbaceous	72.2
Bare ground	20.1
Litter	56.7

Incidental observations:
Achillea millefolium, Agropyron repens, Aster lateriflorus, Campanula rotundifolia, Eleocharis sp., *Hieracium canadense, Mentha arvensis, Rudbeckia hirta, Solidago hispida, Sphenopholis intermedia*

(o) Transect A3c

Species	%
Poa pratensis	53
Carex sp. (medium)	15
Sonchus sp.	4.5
Agropyron trachycaulum	4
Carex sp. (large)	4
Taraxacum officinale	3
Juncus balticus	3
Glycyrrhiza lepidota	1
Aster spp.	1
Erigeron sp.	1
Trifolium sp.	0.5
Fragaria virginiana	0.5
Medicago lupulina	0.5
Vicia americana	0.5
Anemone canadensis	0.5
Galium boreale	Tr
Cirsium (vulgare)	Tr
Cirsium arvense	Tr
Achillea millefolium	Tr
Viola sp.	Tr
Thalictrum sp.	Tr
Rudbeckia hirta	Tr
Comandra umbellata	Tr
Total herbaceous	54
Bare ground	14
Litter	78

Incidental observations:
None.

(p) Transect A3d

Species	%
Poa sp.	22.5
Agropyron sp.	16.5
Carex sp.	15.5
Antennaria parvifolia	11.5
Sonchus sp.	10.5
Potentilla anserina	9.5
Melilotus officinalis/alba	5.5
Juncus sp.	1
Ranunculus sp.	0.5
Antennaria neodioica	0.5
Aster sp.	0.5
Achillea millefolium	0.5
Lobelia spicata	0.5
Viola sp.	Tr
Taraxacum officinale	Tr
Aster ericoides	Tr
Carex aurea	Tr
Astragalus sp.	Tr
Rudbeckia hirta	Tr
Total herbaceous	54.2
Bare ground	22.8
Litter	23.4

Incidental observations:
None.

(q) Transect A4

Species	%
Poa pratensis	20
Agrostis stolonifera	20
Carex sp.	15.5
Sonchus sp.	7.5
Danthonia spicata	6
Aster ericoides	5
Phleum pratense	4.5
Taraxacum officinale	3.5
Lysimachia ciliata	3.5
Juncus sp.	2.5
Medicago lupulina	1.5
Fragaria virginiana	1
Galium boreale	1
Solidago sp.	1
Glycyrrhiza lepidota	1
Helianthus laetiflorus	1
Agropyron sp.	1
Plantago major	0.5
Antennaria parvifolia	0.5
Glyceria (striata)	0.5
Achillea millefolium	0.5
Antennaria neodioica	0.5
Rudbeckia hirta	0.5
Solidago rigida	0.5
Lycopus asper	Tr
Viola sp.	Tr
Hieracium sp.	Tr
Lathyrus sp.	Tr
Vicia americana	Tr
(Panicum lanuginosum)	Tr
Comandra umbellata	Tr
Total herbaceous	66.8
Bare ground	22
Litter	14.9

Incidental observations:
Calamagrostis inexpansa, Campanula rotundifolia, Cirsium flodmanii, Liatris ligulistylis, Melilotus alba, Melilotus officinalis, Orthocarpus luteus, Panicum lanuginosum, Potentilla anserina, Spiranthes romanzoffiana

(r) Transect A4a

Species	%
Carex sp.	22
Poa sp.	18
unID grass (wide lvs, coll.)	16
Melilotus alba	7.5
Agropyron sp.	5.5
Muhlenbergia asperifolia	4
Aster ericoides	4
Medicago lupulina	3.5
Potentilla anserina	3.5
Glycyrrhiza lepidota	3
Agrostis stolonifera	3
Cirsium (vulgare)	1
Sonchus sp.	1
Juncus sp.	1
Thalictrum sp.	1
Solidago sp.	0.5
Comandra umbellata	0.5
Viola sp.	0.5
Rudbeckia hirta	0.5
Cirsium flodmanii	0.5
Orthocarpus luteus	0.5
Aster sp.	Tr
Galium boreale	Tr
Taraxacum officinale	Tr
Antennaria parvifolia	Tr
Fragaria virginiana	Tr
Polygala senega	Tr
(Panicum lanuginosum)	Tr
Total herbaceous	74
Bare ground	26
Litter	24

Incidental observations:
Andropogon gerardii, Andropogon scoparius, Antennaria parvifolia, Apocynum cannabinum, Convolvulus sepium, Spartina pectinata

(s) Transect A4c

Species	%
Achillea millefolium	Tr
Plantago major	0.5
Astragalus sp.	0.5
Antennaria parvifolia	0.5
(Aster ericoides)	0.5
Vicia americana	1
Trifolium sp.	1
Galium boreale	1
Fragaria virginiana	1
(Phalaris arundinacea)	1
Cirsium arvense	1.5
Agropyron sp.	2.5
(Bromus ciliatus)	3
Carex sp.	3.5
Medicago lupulina	4.5
Melilotus officinalis/alba	5
Sonchus sp.	6
Taraxacum officinale	8.5
Bromus inermis	22.5
Poa sp.	35
Total herbaceous	66.5
Bare ground	15.9
Litter	33.5

Incidental observations:
Achillea millefolium, Aster ericoides, Lactuca tatarica, Potentilla fruticosa

(t) Transect A4b

Species	%
unID grass(wide lvs, colr.)	27
Poa sp.	19.5
Carex spp.	8
Agropyron sp.	6
Galium boreale	5
Melilotus officinalis/alba	4
Phleum pratense	4
Fragaria virginiana	3
Cirsium (vulgare)	2
Achillea millefolium	1.5
Solidago rigida	1.5
Hieracium canadense	1.5
Sonchus sp.	1.5
Bromus ciliatus	1.5
Aster ericoides	1
Viola sp.	1
Solidago missouriensis	1
Solidago spp.	1
Medicago sativa	1
Danthonia spicata	1
Helianthus *sp.*	0.5
Medicago lupulina	0.5
Aster laevis	0.5
Poa compressa	0.5
Comandra umbellata	0.5
Thalictrum sp.	Tr
Polygala senega	Tr
Smilacina stellata	Tr
Astragalus sp.	Tr
Orthocarpus luteus	Tr
Gentiana (andrewsii)	Tr
Erigeron sp.	Tr
Anemone canadensis	Tr
(Lactuca sp.)	Tr
(*Panicum lanuginosum*)	Tr
Cypripedium calceolus	Tr
Total herbaceous	71.5
Bare ground	19.1
Litter	33.8

Incidental observations:
Agropyron trachycaulum, Bromus inermis, Calamagrostis neglecta, Campanula rotundifolia, Cirsium flodmanii, Erigeron glabellus, Gentianella amarella, Helianthus maximiliani, Liatris ligulistylis, Lobelia spicata, Potentilla fruticosa, Rumex crispus, Trifolium hybridum

(u) Transect A4e

Species	%
Poa sp.	21
Bromus inermis	13
Agropryon sp.	9.5
Melilotus officinalis/alba	8
Carex sp.	6
Calamagrostis sp.	5.5
Phleum pratense	4.5
Sonchus sp.	4
Medicago lupulina	4
Plantago major	2.5
Solidago sp.	2.5
Fragaria virginiana	2.5
Aster ericoides	2
Aster ciliolatus	2
Cirsium arvense	2
Orthocarpus luteus	1.5
Antennaria parvifolia	1
Cirsium (vulgare)	1
Rudbeckia hirta	1
Muhlenbergia asperifolia	1
Galium boreale	0.5
Comandra umbellata	0.5
Taraxacum officinale	0.5
Hieracium canadense	0.5
Trifolium sp.	Tr
Astragalus sp.	Tr
Campanula rotundifolia	Tr
Thalictrum sp.	Tr
Total herbaceous	73.8
Bare ground	25.1
Litter	33.5

Incidental observations:
Achillea millefolium, Agrostis hyemalis, Astragalus canadensis, Cirsium flodmanii, Gentiana crinita, Helianthus maximiliani, Oenothera biennis

(v) Transect B1

Species	%
Poa sp.	42
Medicago lupulina	18
Bromus sp.	13.5
Melilotus officinalis/alba	9
Agropryon sp.	7.5
Galium boreale	4
Agrostis stolonifera	2
Carex sp.	2
Comandra umbellata	0.5
Campanula rotundifolia	0.5
Trifolium sp.	0.5
Antennaria neodioica	Tr
Taraxacum officinale	Tr
Achillea millefolium	Tr
Rudbeckia hirta	Tr
Total herbaceous	79.3
Bare ground	20.7
Litter	21.8

Incidental observations:
Amaranthus retroflexus, Apocynum androsaemifolium, Artemisia frigida, Aster ciliolatus, Aster simplex, Bromus inermis, Chenopodium album, Cornus stolonifera, Crataegus sp., *Echinochloa crus-galli, Epilobium angustifolium, Equisetum* sp., *Gentianella crinita, Heuchera richardsonis, Hordeum jubatum, Lotus corniculatus, Matricaria matricarioides, Phleum pratense, Plantago major, Solidago gigantea, Spiraea alba*

(w) Transect B1b

Species	%
Poa sp. (incl. *Compressa*)	45
Agropyron sp.	21
Agrostis stolonifera	13
Medicago lupulina	7.5
Bromus inermis	4
Aster ericoides	2.5
Rudbeckia hirta	1.5
Carex sp.	1.5
Taraxacum officinale	1
Antennaria parvifolia	0.5
Antennaria neodioica	0.5
Solidago sp.	0.5
Trifolium sp.	0.5
Cirsium flodmanii	0.5
Vicia americana	0.5
Melilotus officinalis/alba	0.5
Sisyrinchium montanum	Tr
Galium boreale	Tr
Total herbaceous	62
Bare ground	12
Litter	34

Incidental observations:
None.

(x) Transect B1c

Species	%
Poa pratensis	33
Bromus inermis	16.5
Melilotus officinalis/alba	10.5
Medicago lupulina	10
Agropyron sp.	10
Sonchus sp.	7
Agrostis stolonifera	6
Carex sp.	4
Trifolium hybridum	2
Vicia americana	0.5
Petasites sp.	Tr
Galium boreale	Tr
Equisetum sp.	Tr
Total herbaceous	86.5
Bare ground	10.1
Litter	38

Incidental observations:
Agropyron repens, Apocynum cannabinum, Avena fatua, Physostegia virginiana, Polygonum lapathifolium

(y) Transect B2

Species	%
Poa pratensis	70
Carex sp.	22.5
Agropyron sp.	3.5
Artemisia sp.	3
Thalictrum sp.	0.5
Galium boreale	Tr
Trifolium sp.	Tr
Equisetum sp.	Tr
Total herbaceous	75
Bare ground	15.8
Litter	43.5

Incidental observations:
None.

(z) Transect B2b

Species	%
Agrostis stolonifera	36
Poa sp.	27
Carex sp.	8
Juncus sp.	7.5
Muhlenbergia asperifolia	6
Danthonia spicata	3
Phleum pratense	2.5
Aster ericoides	2
Fragaria virginiana	1.5
Sonchus sp.	1.5
Solidago sp.	1.5
Lycopus asper	1
Anemone canadensis	1
unID composite sp.	0.5
Aster ptarmicoides	0.5
Solidago rigida	0.5
Cirsium flodmanii	0.5
Galium boreale	Tr
Campanula rotundifolia	Tr
Viola sp.	Tr
Vicia americana	Tr
Total herbaceous	69
Bare ground	19
Litter	50

Incidental observations:
Aster ciliolatus, Aster laevis, Potentilla fruticosa

(aa) Transect B2c

Species	%
Agrostis stolonifera	25.5
Poa sp.	24.5
Carex sp.	14
Phleum pratense	12
Solidago sp.	4.5
Agropyron sp.	3
Fragaria virginiana	2.5
Taraxacum officinale	2.5
Aster ericoides	1.5
Trifolium sp.	1.5
Rudbeckia hirta	1
Juncus sp.	1
Vicia americana	0.5
Galium boreale	0.5
Hieracium canadense	0.5
Viola sp.	0.5
Lactuca sp.	0.5
Thalictrum sp.	Tr
Achillea millefolium	Tr
Plantago major	Tr
Sonchus sp.	Tr
Polygala senega	Tr
Cirsium (vulgare)	Tr
Comandra umbellata	Tr
Campanula rotundifolia	Tr
Total herbaceous	71.3
Bare ground	24
Litter	15

Incidental observations:
Aster ciliolatus, Aster novae-angliae, Gentiana andrewsii, Gentianella crinita

Table 66. Number of birds detected per period, average number per period and average number per plot (based on 10 plots) for each species recorded in point count survey transect 2, field A3a (10 plots).

Species	Period 1 18-Aug	Period 2 19-Aug	Average (number/period)	Average (number/plot)
Canada goose	0	1	0.5	0.05
Sandhill crane	0	1	0.5	0.05
Blue-winged teal	0	1	0.5	0.05
Common snipe	5	0	2.5	0.25
Red-tailed hawk	1	0	0.5	0.05
Mourning dove	0	1	0.5	0.05
Black-billed magpie	1	0	0.5	0.05
Brewer's blackbird	0	1	0.5	0.05
Western meadowlark	3	6	4.5	0.45
American crow	4	5	4.5	0.45
Eastern bluebird	0	1	0.5	0.05
American robin	2	0	1	0.1
American goldfinch	1	0	0.5	0.05
Eastern kingbird	0	1	0.5	0.05
Bobolink	0	1	0.5	0.05
Savannah sparrow	10	9	9.5	0.95
Clay-colored sparrow	1	2	1.5	0.15
Chipping sparrow	3	4	3.5	0.35
Le Conte's sparrow	0	2	1	0.1
Song sparrow	1	0	0.5	0.05
Totals	32	36	34	3.4

Table 67. Number of animals caught per trap night, total number caught and abundance index for each species caug in snap trap transect 2, field A3a (50 traps).

Species	Trap night				Abundance index
	1 (18-Jul)	2 (19-Jul)	3 (20-Jul)	Total	(n=3 x 50)
Meadow vole	2	3	4	9	0.06
Totals	2	3	4	9	0.06

Table 68. List of all plant species observed in Grassland habitat, Alonsa Community Pasture.

Plants		
Achillea millefolium	*Dalea purpurea*	*Muhlenbergia glomerata*
Agoseris glauca	*Danthonia spicata*	*Muhlenbergia richardsonis*
Agropyron repens	*Echinochloa crus-galli*	*Oenothera biennis*
Agropyron smithii	*Eleocharis* sp.	*Orhtocarpos luteus*
Agropyron sp.	*Elymus* sp.	*Panicum capillare*
Agropyron trachycaulum	*Epilobium angustifolium*	*Panicum lanuginosum*
Agrostis hyemalis	*Equisetum* sp.	*Parnassia* sp.
Agrostis stolonifera	*Erigeron acris*	*Petasites sagittatus*
Alisma plantago-aquatica	*Erigeron glabellus*	*Phalaris arundinacea*
Amaranthus retroflexus	*Erigeron strigosus*	*Phleum pratense*
Andropogon gerardii	*Fragaria virginiana*	*Physostegia virginiana*
Andropogon scoparius	*Galium boreale*	*Plantago major*
Anemone canadensis	*Gentiana affinis*	*Poa compressa*
Antennaria neodioica	*Gentiana andrewsii*	*Poa pratensis*
Antennaria parviflora	*Gentiana crinita*	*Polygala senega*
Apocynum androsaemifolium	*Gentianella amarella*	*Polygonum lapathifolium*
Apocynum cannabinum	*Gentianella crinita*	*Potentilla anserina*
Artemisia absinthium	*Glyceria striata*	*Potentilla fruticosa*
Artemisia frigida	*Glycyrrhiza lepidota*	*Prenanthes* sp.
Artemisia sp.	*Grindelia squarrosa*	*Prunella vulgaris*
Asclepias sp.	*Helianthus laetiflorus*	*Ranunculus cymbalaria*
Aster ciliolatus	*Helianthus maximiliani*	*Ranunculus* sp.
Aster ericoides	*Helictotrichon hookeri*	*Rudbeckia hirta*
Aster laevis	*Heuchera richardsonis*	*Rumex crispus*
Aster lateriflorus	*Hieracium canadense*	*Sisyrinchium montanum*
Aster novae-angliae	*Hierochlöe odorata*	*Sium suave*
Aster ptarmicoides	*Hordeum jubatum*	*Smilacina stellata*
Aster simplex	*Juncus balticus*	*Smilax lasioneura*
Astragalus canadense	*Juncus bufonius*	*Solidago canadensis*
Astragalus sp.	*Juncus longistylis*	*Solidago gigantea*
Avena fatua	*Juncus nodosus*	*Solidago graminifolia*
Beckmannia syzigachne	*Juncus tenuis*	*Solidago hispida*
Brassica kaber	*Lactuca* sp.	*Solidago missouriensis*
Bromus ciliatus	*Lactuca tatarica*	*Solidago rigida*
Bromus inermis	*Lathyrus* sp.	*Sonchus arvensis*
Calamagrostis canadensis	*Lepidium densiflorum*	*Spartina pectinata*
Calamagrostis inexpansa	*Liatris ligulistylis*	*Sphenopholis intermedia*
Calamagrostis neglecta	*Lilium philadelphicum*	*Spiranthes romanzoffiana*
Campanula rotundifolia	*Lithospermum canescens*	*Spiraea alba*
Carex aurea	*Lobelia kalmii*	*Stachys palustris*
Carex lanuginosa	*Lobelia spicata*	*Symphoricarpos* sp.
Carex viridula	*Lotus corniculatus*	*Taraxacum officinale*
Castilleja miniata	*Lycopus asper*	*Thalictrum* sp.
Chenopodium album	*Lysimachia ciliata*	*Tofieldia glutinosa*
Cirsium arvense	*Maianthemum canadense*	*Trifolium hybridum*

Cont'd...

Plants (cont'd)		
Cirsium flodmanii	*Matricaria matricarioides*	*Trifolium repens*
Cirsium vulgare	*Medicago lupulina*	*Triglochin maritima*
Comandra umbellata	*Medicago sativa*	*Vicia americana*
Convolvulus sepium	*Melilotus alba*	*Viola adunca*
Cornus stolonifera	*Melilotus officinalis*	*Zizia aptera*
Crataegus sp.	*Mentha arvensis*	*Zizia aurea*
Cypripedium calceolus	*Monarda fistulosa*	*Zigadenus elegans*
Dalea candida	*Muhlenbergia asperifolia*	
Birds		
American crow	Clay-colored sparrow	Northern goshawk
American goldfinch	Common nighthawk	Northern harrier
American kestrel	Common raven	Red-tailed hawk
American robin	Common snipe	Ring-billed gull
American white pelican	Common yellowthroat	Sandhill crane
Barn swallow	Eastern bluebird	Savannah sparrow
Black-billed magpie	Eastern kingbird	Sharp-shinned hawk
Blue-winged teal	Horned lark	Sharp-tailed grouse
Bobolink	Killdeer	Song sparrow
Brown-headed cowbird	Le Conte's sparrow	Western kingbird
Canada Goose	Marbled godwit	Western meadowlark
Chipping sparrow	Mourning dove	Whip-poor-will
Mammals		
Coyote	Franklin's ground squirrel	White-tailed deer
Eastern cottontail	Meadow vole	
Amphibians		
Wood frog		
Reptiles		
Western plains garter snake		
Dragonflies		
Canada darner		
Butterflies		
Cabbage white	Northwestern fritillary	Viceroy
Common sulphur	Ringlet	

Appendix X

Data summary for Wetland habitat transects, Alonsa Community Pasture.

Table 69 (a) to (c). Mean estimated biomass (% of total) for each species with biomass > 5% in at least one quadrat on the transect, as well as mean total herbaceous cover (%), mean bare ground cover (%), mean litter cover (%) and incidental species observations for each wetland transect. (Tr = trace, less than 0.5% mean biomass.)

(a) Transect A2f

Species	%
Carex sp. (tall, thin)	57.5
Calamagrostis sp.	17.5
Carex atherodes	7
Scirpus (lacustris)	4.5
Juncus balticus	3.5
Phalaris arundinacea	2.5
Polygonum sp.	1.5
Scutellaria sp.	1.5
Scripus sp. (small)	1.5
Mentha arvensis	1.5
Campanula aparinoides	0.5
Stachys palustris	Tr
Total herbaceous	50.0
Bare ground	N/A
Litter	61.8

Incidental observations:
Galium trifidum, Rorippa sp.

(b) Transect A3c

Species	%
Carex sp.	30
Poa sp.	24
Juncus sp.	15
Sonchus sp.	6.5
Agropyron sp.	6
Calamagrostis sp.	4.5
Prunella vulgaris	2.5
Scirpus sp. (small)	2.5
Hordeum jubatum	1
Aster ericoides	1
Stachys palustris	1
Comandra umbellata	0.5
Potentilla anserina	0.5
Smilacina stellata	0.5
Solidago sp.	0.5
Fragaria virginiana	0.5
Ranunculus sp.	Tr
Rudbeckia hirta	Tr
Taraxacum officinale	Tr
Vicia sp.	Tr
Cirsium (vulgare)	Tr
Achillea millefolium	Tr
Thalictrum sp.	Tr
Total herbaceous	38.3
Bare ground	22.7
Litter	43.3

Incidental observations:
Calamagrostis neglecta, Carex (rostrata), Carex aquatilis, Carex atherodes, Carex granularis, Carex lanuginosa, Deschampsia caespitosa, Glyceria striata, Lysimachia thyrsiflora, Mentha arvensis

(c) Transect A3d

Species	%
Carex sp. (Tall, thin)	41
Juncus sp.	27
Poa sp.	12
Potentilla anserina	6.5
Stachys palustris	4
Triglochin maritima	3
Scirpus sp.	2
Scutellaria epilobifolia	1.5
Agropyron sp.	1
Aster ericoides	0.5
Carex aurea	0.5
Taraxacum officinale	Tr
Total herbaceous	51.4
Bare ground	7.9
Litter	52.8

Incidental observations:
None.

Table 70. Number of birds detected per period, average number per period and average number per plot (based on 10 plots) for each species recorded in point count survey transect 3, wetland, field A3d (7 plots).

Species	Period 1 18-Aug	Period 2 19-Aug	Average (number/period)	Average (number/plot)
Mallard	2	7	4.50	0.64
Blue-winged teal	4	5	4.50	0.64
Green-winged teal	0	2	1.00	0.14
Ruddy duck	0	1	0.50	0.07
Great-blue heron	1	0	0.50	0.07
Sora	0	1	0.50	0.07
Spotted sandpiper	0	1	0.50	0.07
Marbled godwit	1	0	0.50	0.07
Common snipe	0	1	0.50	0.07
Black-crowned night-heron	0	1	0.50	0.07
American kestrel	1	1	1.00	0.14
Western meadowlark	3	4	3.50	0.50
American crow	3	6	4.50	0.64
Brown-headed cowbird	0	1	0.50	0.07
Red-winged blackbird	0	2	1.00	0.14
Yellow-headed blackbird	0	1	0.50	0.07
Barn swallow	20	0	10.00	1.43
Marsh wren	2	3	2.50	0.36
Sedge wren	13	1	7.00	1.00
Canada warbler	0	1	0.50	0.07
Song sparrow	1	0	0.50	0.07
Totals	51	39	45.00	6.43

Table 71. Number of animals caught per trap night, total number caught and abundance index for each species caught in snap trap transect 3, wetland, field A3d (50 traps).

Species	Trap night				Abundance index
	1 (15-Jul)	2 (16-Jul)	3 (17-Jul)	Total	(n=3 x 50)
Meadow vole	1	0	0	1	0.0067
Savannah sparrow	0	1	0	1	0.0067
Totals	1	1	0	2	0.0133

Table 72. List of all species observed in Wetland habitat, Alonsa Community Pasture.

Plants		
Achillea millefolium	*Comandra umbellata*	*Rorippa* sp.
Agropyron sp.	*Deschampsia caespitosa*	*Rudbeckia hirta*
Asclepias incarnata	*Fragaria virginiana*	*Sagittaria cuneata*
Aster ericoides	*Galium trifidum*	*Scirpus (lacustris)*
Bidens vulgata	*Glyceria striata*	*Scripus* sp.
Calamagrostis neglecta	*Hordeum jubatum*	*Scutellaria epilobifolia*
Calamagrostis sp.	*Juncus balticus*	*Sium suave*
Campanula aparinoides	*Juncus* sp.	*Smilacina stellata*
Carex (rostrata)	*Lysimachia thyrsiflora*	*Solidago* sp.
Carex aquatilis	*Mentha arvensis*	*Sonchus* sp.
Carex atherodes	*Phalaris arundinacea*	*Stachys palustris*
Carex aurea	*Poa* sp.	*Taraxacum officinale*
Carex granularis	*Polygonum* sp.	*Thalictrum* sp.
Carex lanuginosa	*Potentilla anserina*	*Triglochin maritima*
Carex spp.	*Prunella vulgaris*	*Utricularia vulgaris*
Cirsium vulgare	*Ranunculus* sp.	*Vicia americana*
Birds		
Alder flycatcher	Cedar waxwing	Red-winged blackbird
American bittern	Common snipe	Ring-billed gull
American crow	Eastern kingbird	Ruddy duck
American goldfinch	Franklin's gull	Sedge wren
American kestrel	Great blue heron	Sharp-shinned hawk
American white pelican	Green-winged teal	Song sparrow
Barn swallow	Killdeer	Sora
Black tern	Mallard	Spotted sandpiper
Black-crowned night heron	Marbled godwit	Upland sandpiper
Blue-winged teal	Marsh wren	Western kingbird
Brewer's blackbird	Mourning dove	Western meadowlark
Brown-headed cowbird	Northern goshawk	Whip-poor-will
Canada Goose	Northern harrier	Yellow rail
Canada warbler	Red-tailed hawk	Yellow-headed blackbird
Mammals		
Coyote	Meadow vole	
Amphibians		
Boreal chorus frog	Wood frog	
Reptiles		
Western plains garter snake		

Cont'd...

Dragonflies	
Canada darner	Twelve-spotted skimmer
Butterflies	
Common wood nymph	Great spangled fritillary

Appendix XI

Transect location maps, Alonsa Wildlife Management Area

Figure 4. Map showing locations of vegetation transects 3-ASPEN WOODLAND (plots 1-3) and 2-SCRUBBY OAK (plots 1-3), bird point count transect 1-WOODLAND (plots 1-10), snap traps-WOODLAND (traps 1 & 25) and bat monitoring site-WOODLAND for Alonsa Wildlife Management Area study site (summer, 1999).

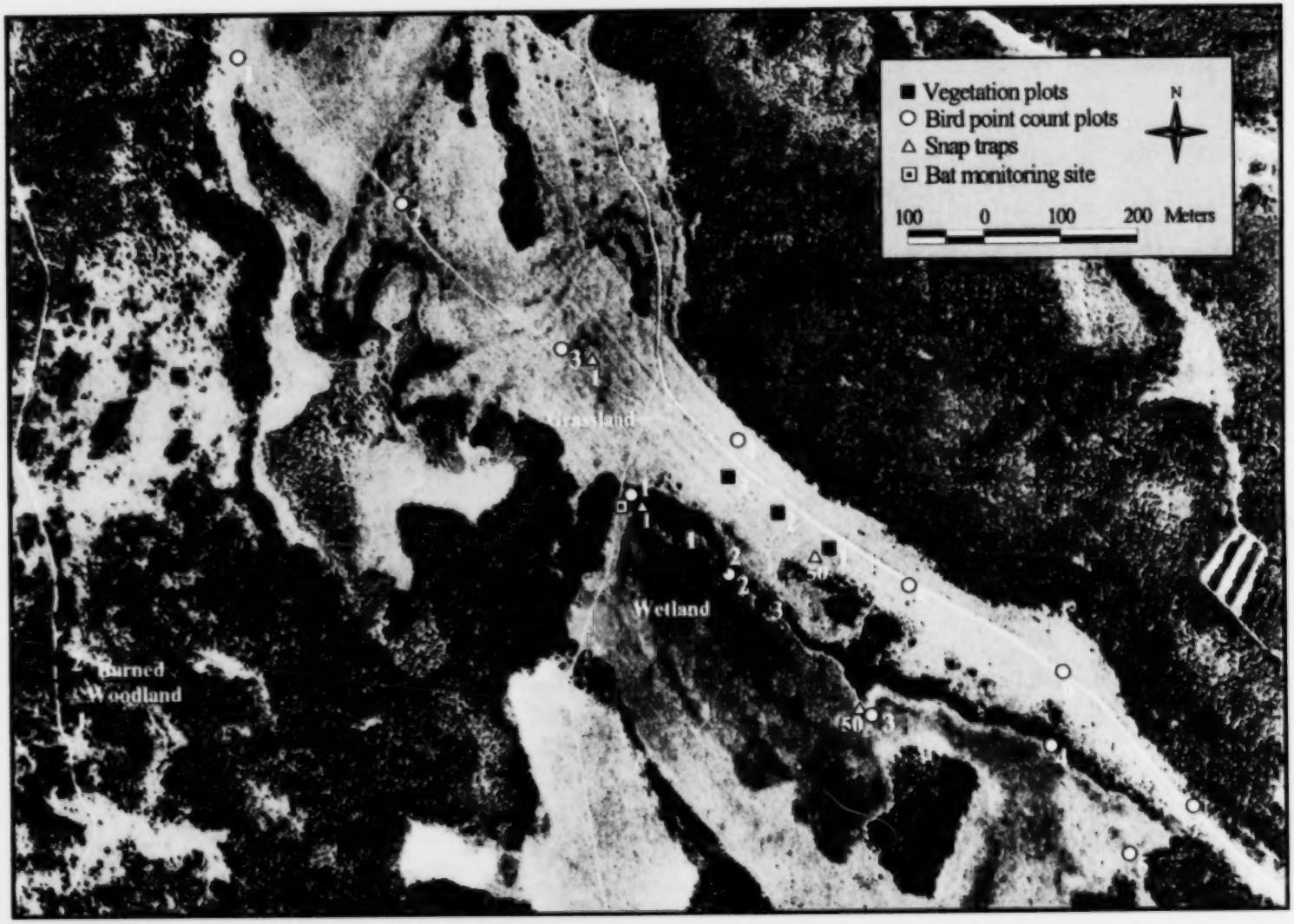


Figure 5. Map showing locations of vegetation transects 1-PRAIRIE RIDGE GRASSLAND (plots 1-3), 5-WETLAND (plots 1-3) and 6-BURNED WOODLAND (plots 1-2), bird point count transects 2-GRASSLAND (plots 1-7 of 10) and 3-WETLAND (plots 1-5), snap traps-GRASSLAND (traps 1 & 50) and WETLAND (traps 1 & 50) and bat monitoring site-WETLAND for Alonsa Wildlife Management Area study site (summer, 1999).

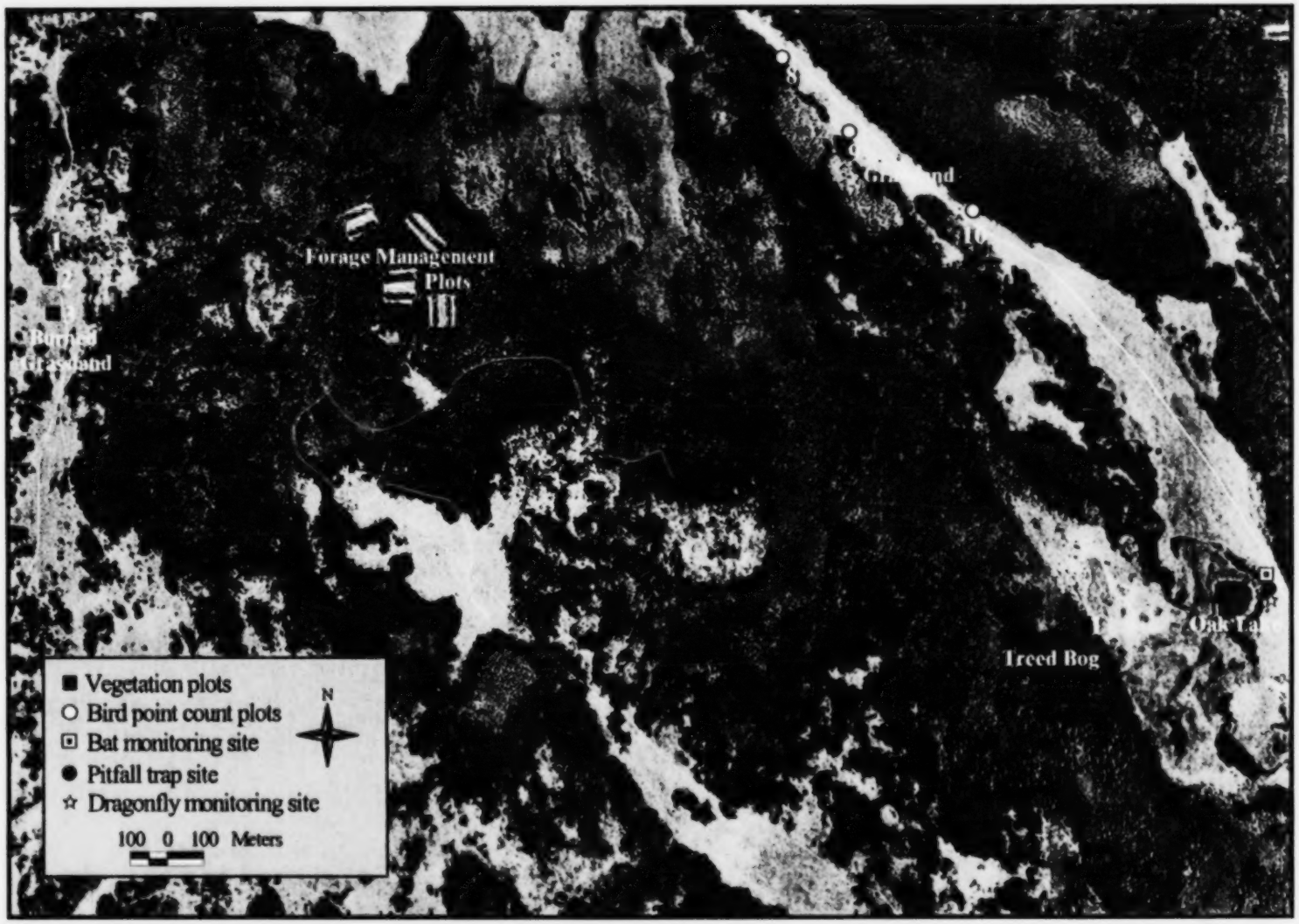
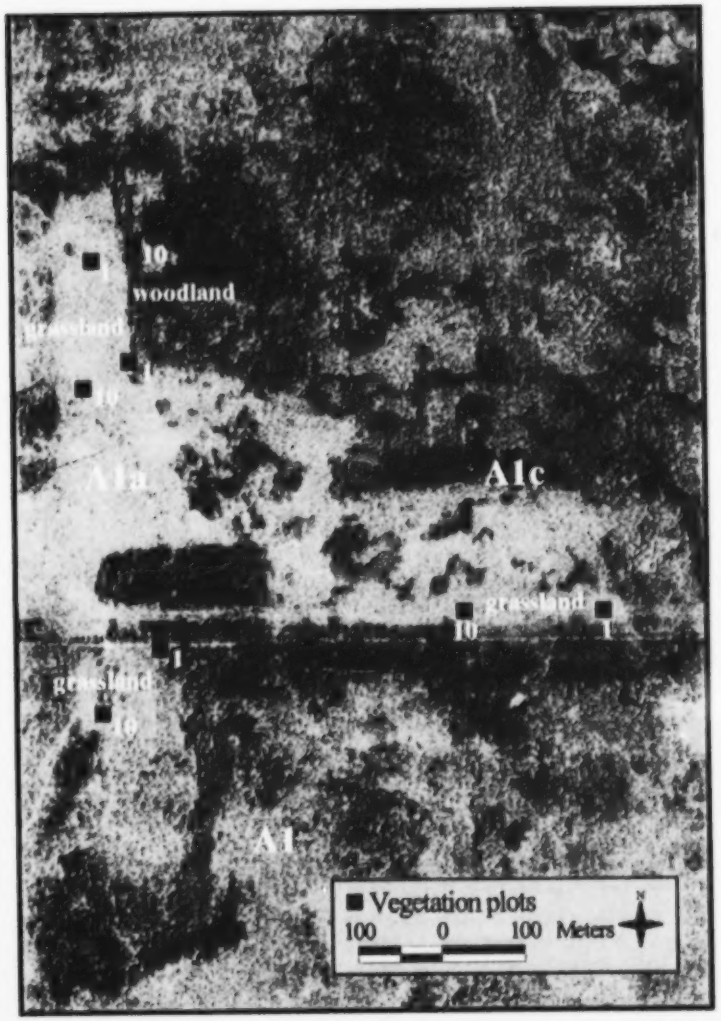


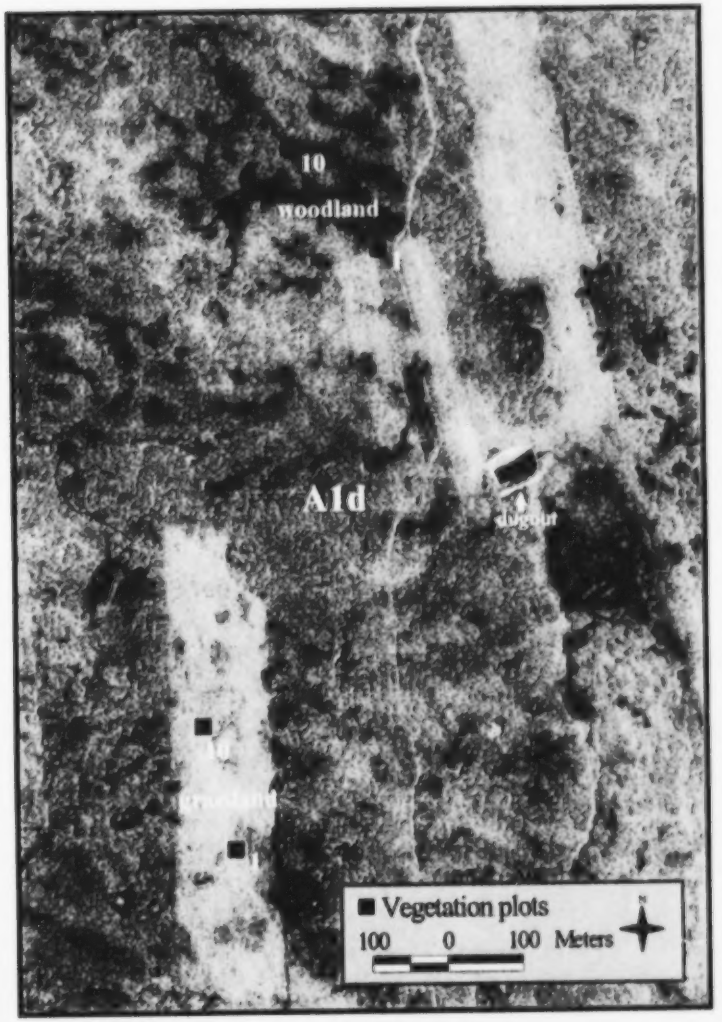
Figure 6. Map showing locations of vegetation transects 4-TREED BOG (plot 1) and 6-BURNED GRASSLAND (plots 1-3), bird point count transect 2-GRASSLAND (plots 8-10), bat monitoring site-GRASSLAND, pitfall trap site, dragonfly monitoring site, Oak Lake and forage management plots for Alonsa Wildlife Management Area study site (summer, 1999).

Appendix XII

Transect location maps, Alonsa Community Pasture



(a)



(b)

Figure 7. Maps showing vegetation transects (plot 1 & 10) (a) A1-GRASSLAND, A1a-WOODLAND and GRASSLAND and A1c-GRASSLAND and (b) A1d-WOODLAND and GRASSLAND of Alonsa PFRA Community Pasture study site (note: fencelines are not indicated) (summer, 1999).

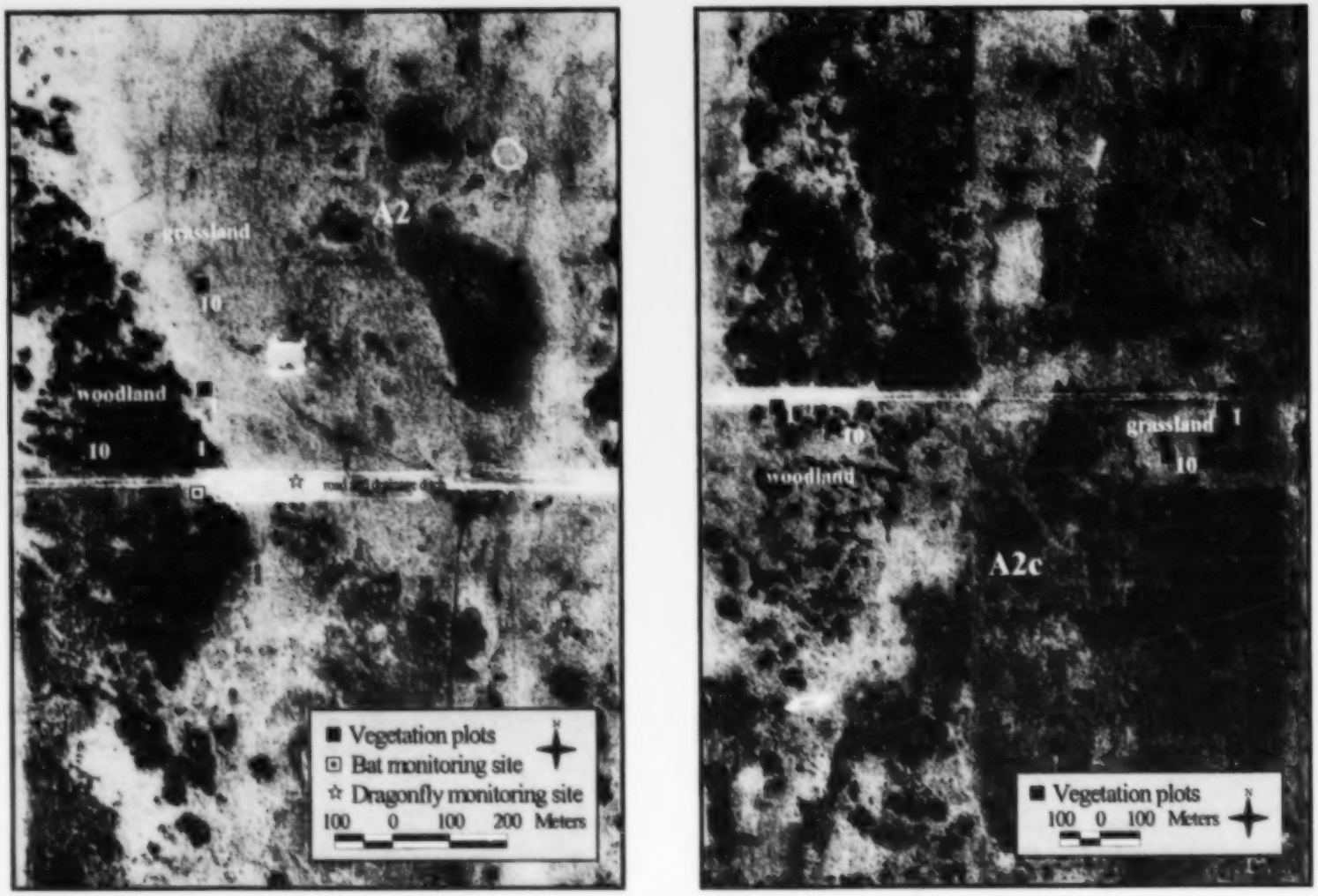


Figure 8. Maps showing (a) vegetation transects (plot 1 & 10) A2-WOODLAND and GRASSLAND, bat monitoring site-WETLAND and dragonfly monitoring site and (b) vegetation transects (plot 1 & 10) A2c-WOODLAND and GRASSLAND of Alonsa PFRA Community Pasture study site (note: fencelines are not indicated) (summer, 1999).

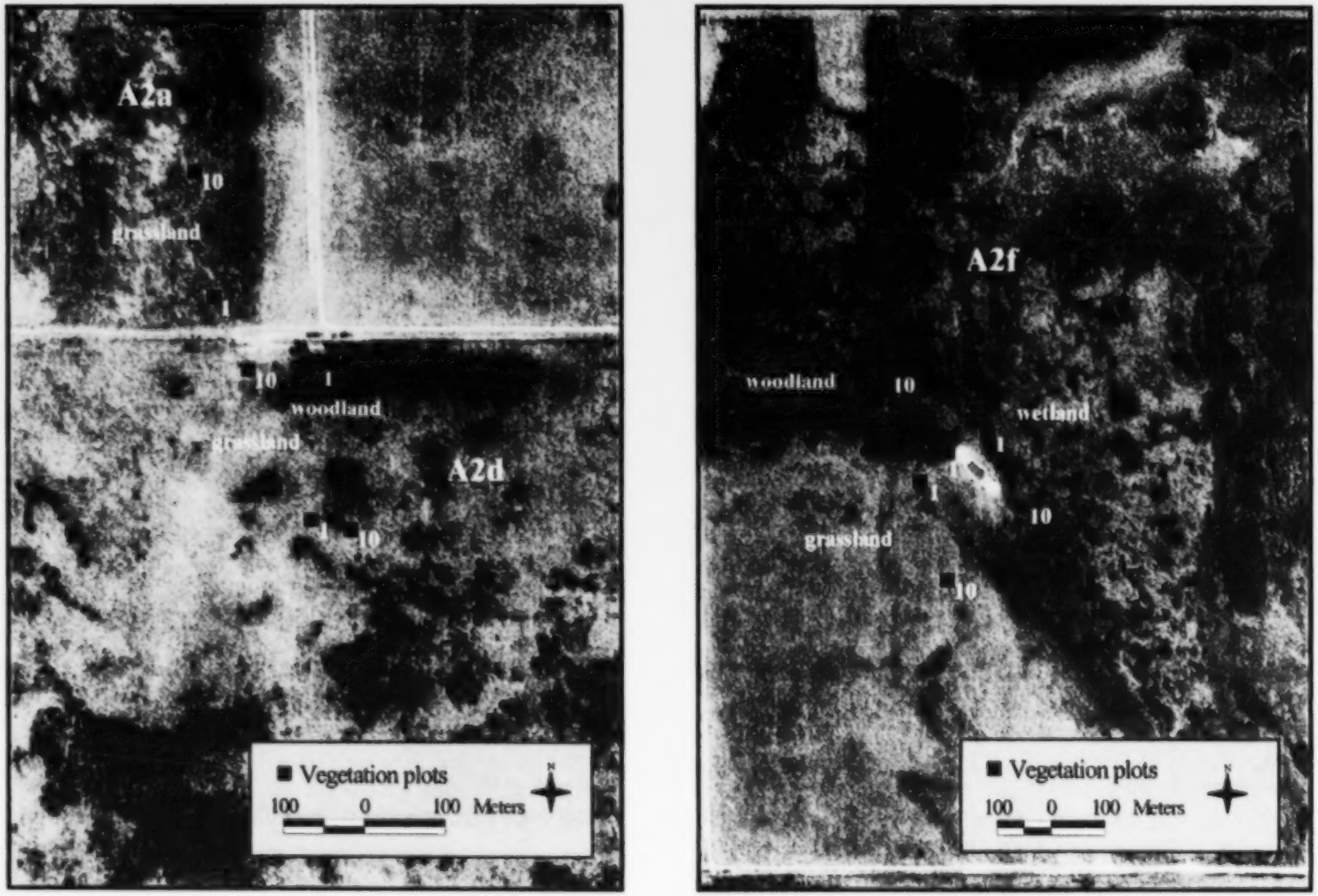


Figure 9. Maps showing vegetation transects (plot 1 & 10) (a) A2a-GRASSLAND and A2d-WOODLAND and GRASSLAND and (b) A2f-WOODLAND, GRASSLAND and WETLAND of Alonsa PFRA Community Pasture study site (note: fencelines are not indicated) (summer, 1999).

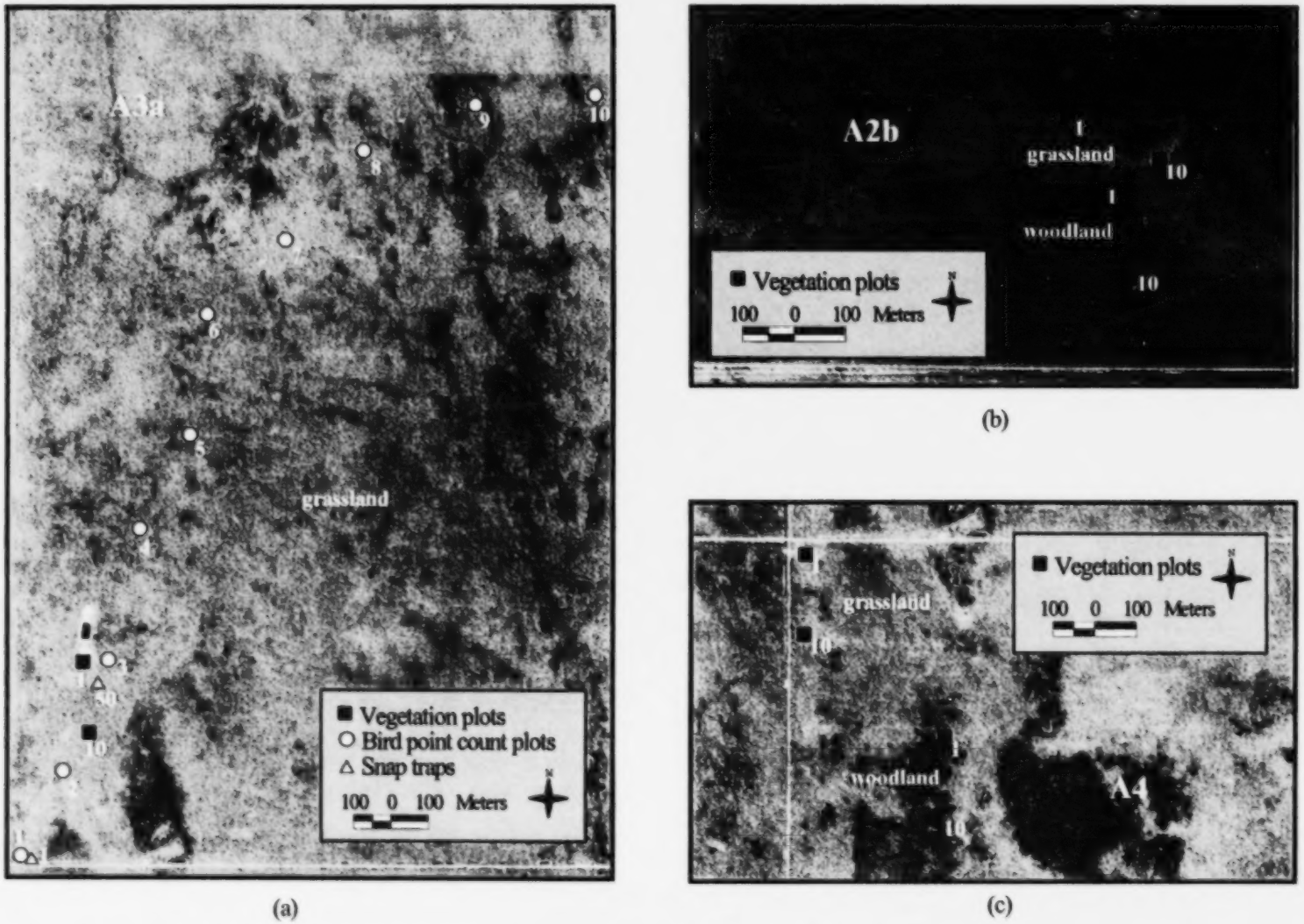


Figure 10. Maps showing (a) vegetation transect (plot 1 & 10) A3a-GRASSLAND, bird point count transect (plots 1-10) 2-GRASSLAND and snap traps-GRASSLAND (traps 1 & 50), (b) vegetation transects (plot 1 & 10) A2b-WOODLAND and GRASSLAND and (c) vegetation transects (plot 1 & 10) A4-WOODLAND and GRASSLAND of Alonsa PFRA Community Pasture study site (note: fencelines are not indicated) (summer, 1999).

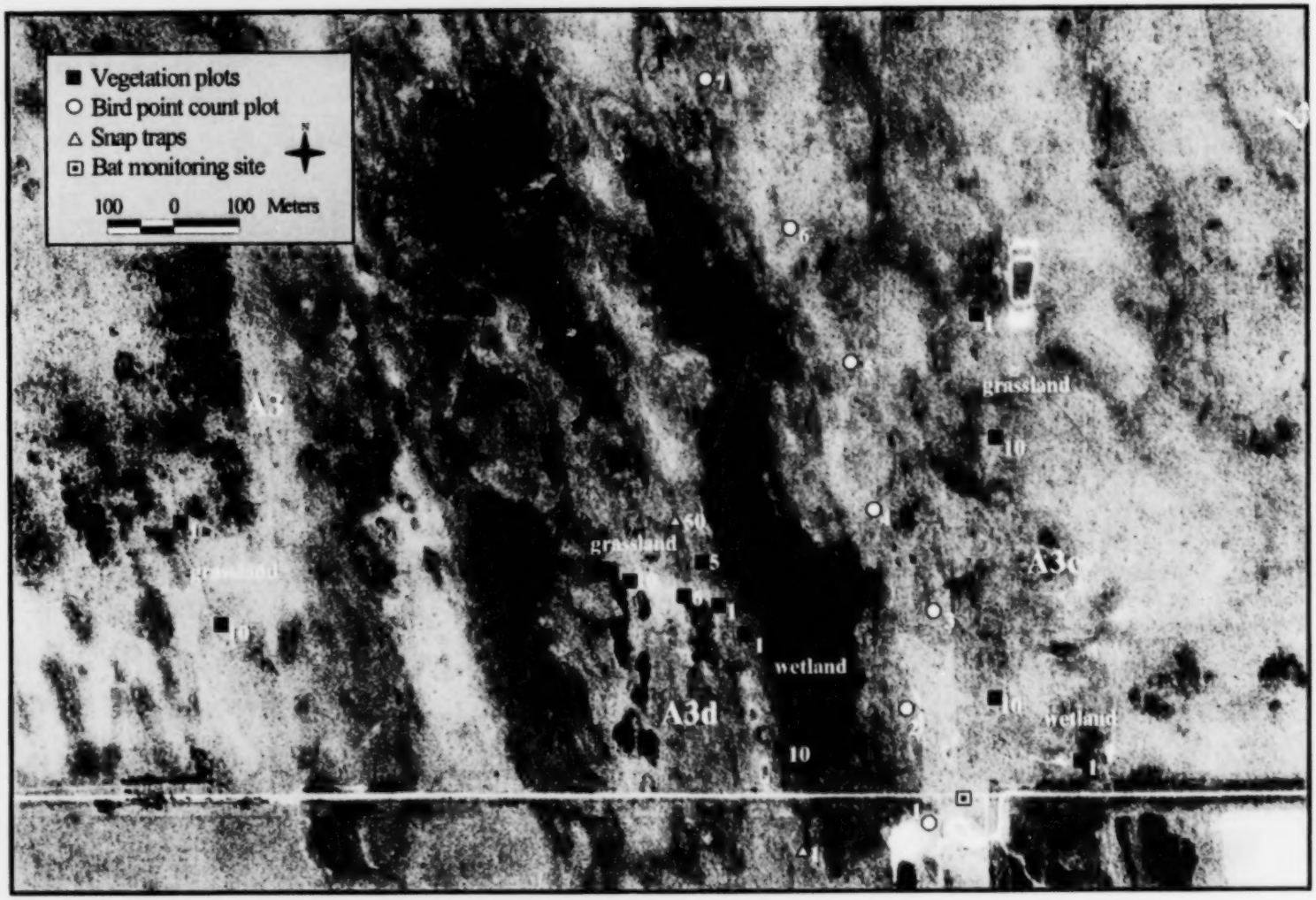


Figure 11. Map showing vegetation transects (plot 1 & 10) A3-GRASSLAND, A3c-GRASSLAND and WETLAND, A3d-WETLAND and (plot 1,5,6 & 10) A3d-GRASSLAND, bird point count transect (plots 1-7 of 7) 3-WETLAND, snap traps-WETLAND (traps 1 & 50) and bat monitoring site-GRASSLAND of Alonsa PFRA Community Pasture study site (note: fencelines are not indicated) (summer, 1999).

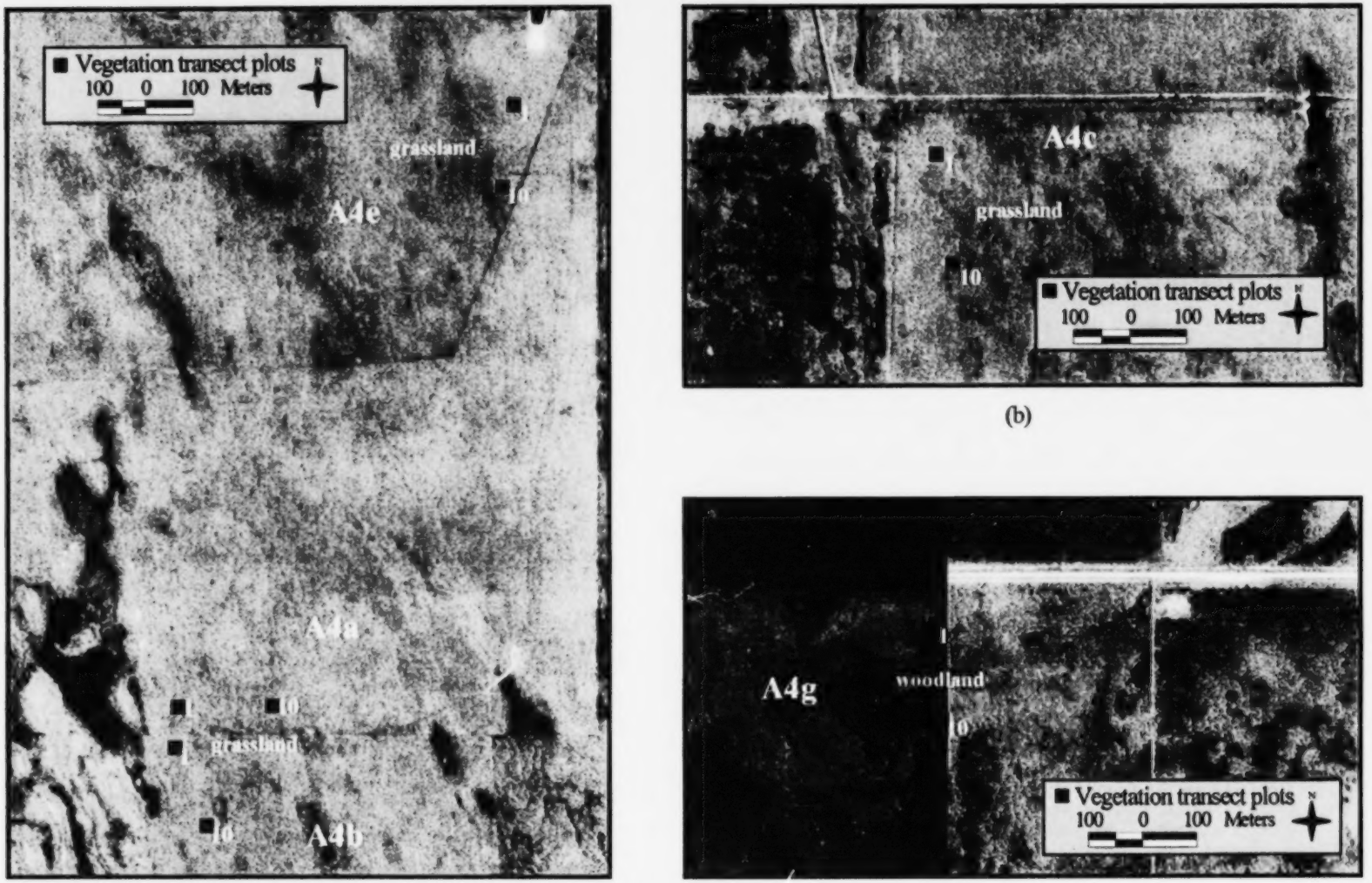
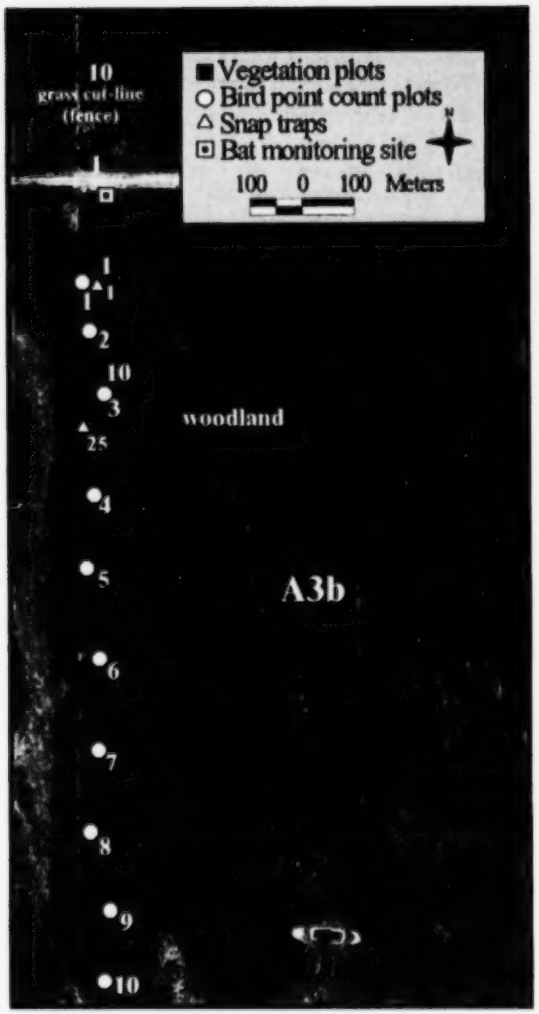
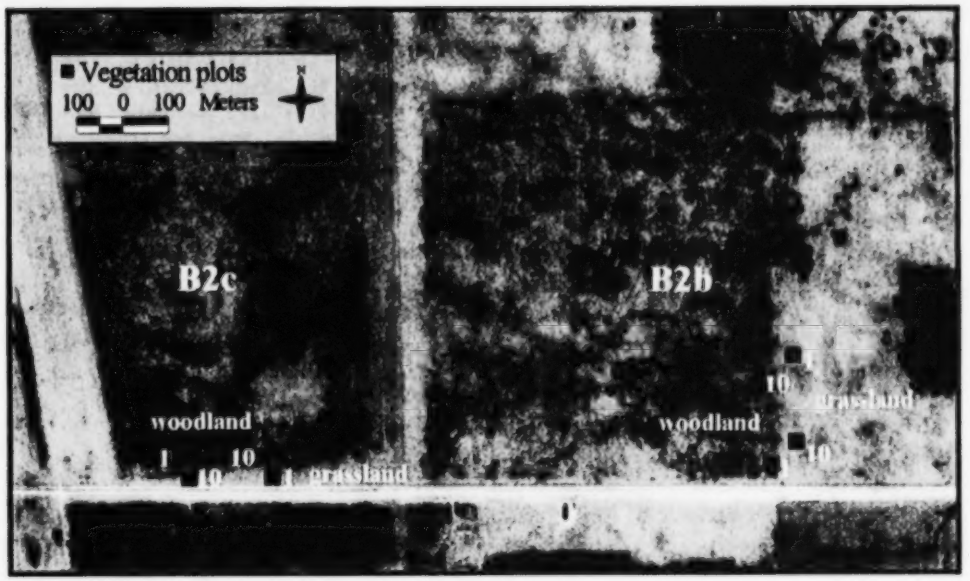


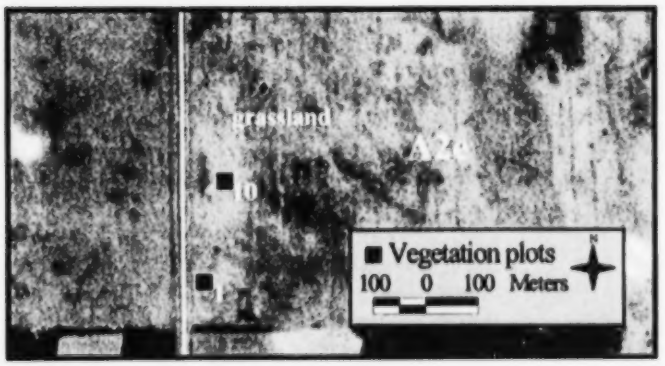
Figure 12. Maps showing locations of vegetation transects (plot 1 & 10) (a) A4a-GRASSLAND, A4b-GRASSLAND and A4e-GRASSLAND, (b) A4c-GRASSLAND and (c) A4g-WOODLAND of Alonsa PFRA Community Pasture study site (note: fencelines are not indicated) (summer, 1999).



(a)



(b)



(c)

Figure 13. Maps showing locations of (a) vegetation transects (plot 1 & 10) A3b-WOODLAND and GRASSLAND, bird point count transect (plots 1-10) 1-WOODLAND, snap traps-WOODLAND (traps 1 & 25) and bat monitoring site-WOODLAND, (b) vegetation transects (plot 1 & 10) B2b-WOODLAND and GRASSLAND and B2c-WOODLAND and GRASSLAND and (c) vegetation transect (plot 1 & 10) A2e-GRASSLAND of Alonsa PFRA Community Pasture study site (note: fencelines are not indicated) (summer, 1999).

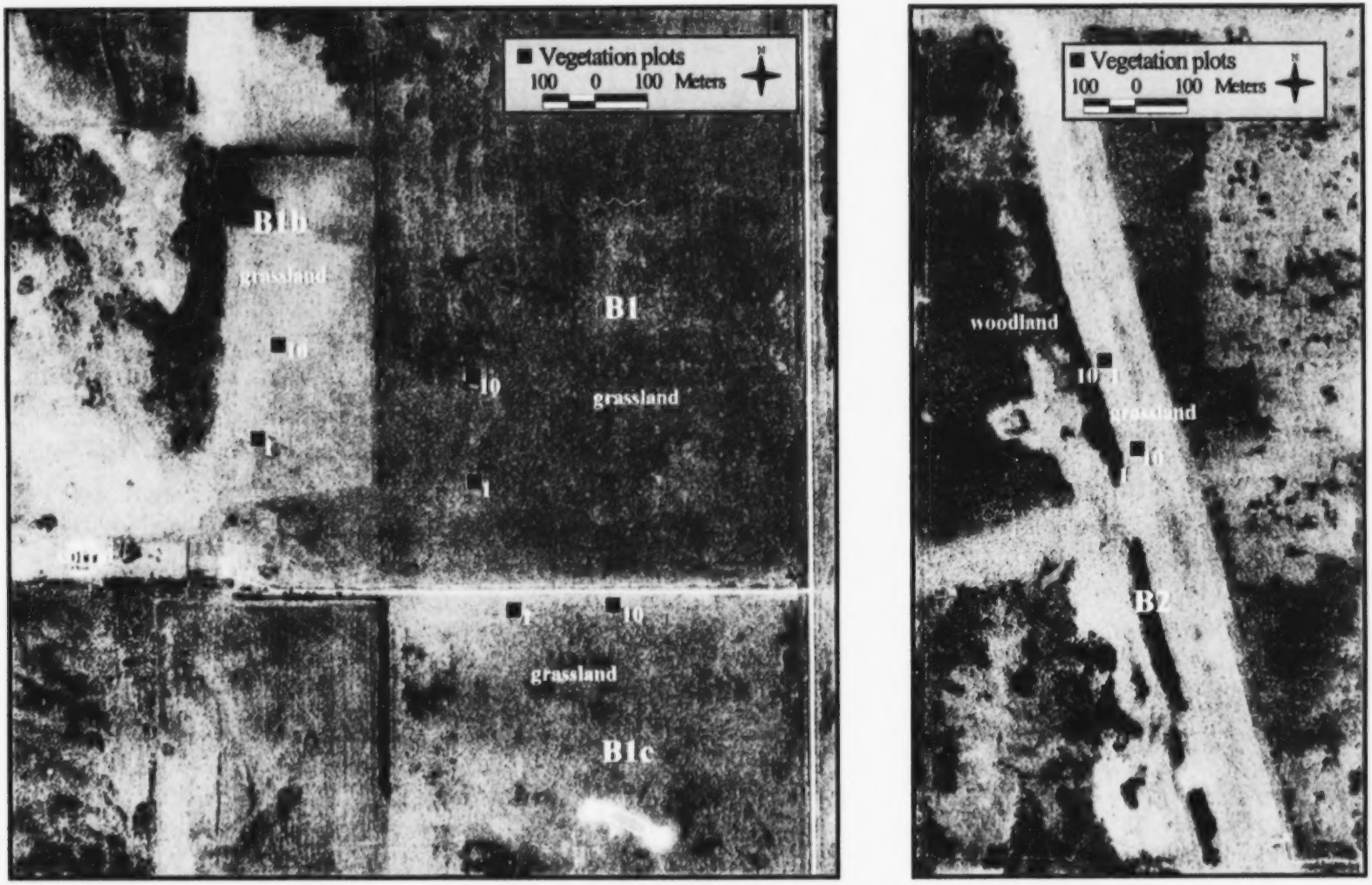


Figure 14. Maps showing locations of vegetation transects (plot 1 & 10) (a) B1, B2b, B1c-GRASSLAND and (b) B2-WOODLAND and GRASSLAND of Alonsa PFRA Community Pasture study site (note: fencelines are not indicated) (summer, 1999).

Appendix XIII

Plant species with authority, family, study area(s), habitat type(s) and flowering dates for Alonsa Wildlife Management Area and Alonsa Community Pasture

* after Species name indicates species is exotic (non-native)
Y = species recorded in study area
Co = species recorded in Conifer woodland (Treed bog)
De = species recorded in Deciduous woodland (Aspen woodland) (* indicates species recorded in burned woodland)
Sc = species recorded in Scrubby Oak habitat
Gr = species recorded in Grassland (* indicates recorded in burned grassland)
We = species recorded in Wetland
X = species recorded flowering in that month
Fr = species recorded fruiting in that month

Scientific name	Common name	Family	Location		Habitat					Phenology		
			WMA	PFRA	Co	De	Sc	Gr	We	June	July	Aug.
Achillea millefolium L.*	Common yarrow	Asteraceae	Y	Y		De	Sc	Gr*	We	X	X	X
Actaea rubra (Ait.) Willd.	Red baneberry	Ranunculaceae		Y		De						
Agastache foeniculum (Pursh) Kuntze	Blue giant hyssop	Lamiaceae	Y	Y		De*		Gr			X	X
Agoseris glauca (Pursh) Raf.	False dandelion	Asteraceae	Y	Y		De	Sc	Gr*	We	X		
Agropyron repens (L.) Beauv.*	Quack grass	Poaceae	Y	Y				Gr				
Agropyron smithii Rydb.	Western wheat grass	Poaceae	Y	Y				Gr				
Agropyron sp. (unidentified)	A wheat grass (unidentified)	Poaceae	Y	Y		De		Gr	We			
Agropyron trachycaulum (Link) Malte	Slender wheat grass	Poaceae	Y	Y		De		Gr*				
Agrostis hyemalis (Walt.) B. S. P.	Tickle-grass	Poaceae	Y	Y				Gr*				
Agrostis stolonifera L.*	Redtop	Poaceae	Y	Y		De		Gr			X	
Alisma plantago-aquatica L.	Common water-plantain	Alismataceae	Y	Y				Gr	We			
Allium stellatum Nutt. ex Ker-Gawl.	Pink-flowered onion	Liliaceae	Y	Y				Gr*			X	X
Amaranthus retroflexus L.*	Red-footed pigweed	Amaranthaceae		Y				Gr				
Amelanchier alnifolia (Nutt.) Nutt. *ex* M. Roemer	Saskatoon	Rosaceae	Y	Y		De*	Sc	Gr*			Fr	

Scientific name	Common name	Family	Location		Habitat					Phenology		
			WMA	PFRA	Co	De	Sc	Gr	We	June	July	Aug.
Andromeda glaucophylla Link.	Bog-rosemary	Ericaceae	Y		Co						X	
Andropogon gerardii Vitman	Big bluestem	Poaceae	Y	Y				Gr*				
Andropogon scoparius Michx.	Little bluestem	Poaceae	Y	Y				Gr*				
Androsace septentrionalis L.	Pygmyflower	Primulaceae	Y					Gr*				
Anemone canadensis L.	Canada anemone	Ranunculaceae	Y	Y		De	Sc	Gr*		X	X	
Anemone cylindrica Gray	Thimbleweed	Ranunculaceae	Y					Gr				
Anemone patens L.	Prairie crocus	Ranunculaceae	Y				Sc	Gr*		Fr		
Anemone virginiana L.	Virginia anemone	Ranunculaceae	Y			De						
Anemone sp. (unidentified)	An anemone (unidentified)	Ranunculaceae	Y	Y		De		Gr				
Antennaria neodioica Greene	Common pussy-toes	Asteraceae	Y	Y		De		Gr*				
Antennaria parvifolia Nutt.	Small-leaved everlasting	Asteraceae	Y	Y				Gr			X	
Antennaria pulcherrima (Hook.) Greene	Showy everlasting	Asteraceae	Y				Sc					X
Antennaria sp. (unidentified)	An everlasting (unidentified)	Asteraceae	Y	Y			Sc	Gr				
Apocynum androsaemifolium L.	Spreading dogbane	Apocynaceae	Y	Y		De*	Sc	Gr			X	
Apocynum cannabinum L.	Indian-hemp	Apocynaceae	Y	Y				Gr				X
Arabis divaricarpa A. Nels.	Purple rock cress	Brassicaceae	Y				Sc	Gr		X, Fr	X	
Arabis hirsuta (L.) Scop.	Hirsute rock cress	Brassicaceae	Y					Gr				
Arabis sp. (unidentified)	A rock cress (unidentified)	Brassicaceae	Y					Gr*				
Aralia nudicaulis L.	Wild sarsaparilla	Araliaceae	Y	Y	Co	De*						
Arctostaphylos uva-ursi (L.) Spreng.	Common bearberry	Ericaceae	Y				Sc	Gr*				
Arenaria stricta Michx. var. *dawsonensis* (Britt.) Scoggan	Sandwort	Caryophyllaceae	Y					Gr				X
Artemisia absinthium L.*	Absinthe	Asteraceae		Y				Gr				X
Artemisia campestris L.	Plains wormwood	Asteraceae	Y					Gr*				X
Artemisia frigida Willd.	Prairie sagewort	Asteraceae	Y	Y			Sc	Gr*				X
Artemisia ludoviciana Nutt.	Western mugwort	Asteraceae	Y	Y			Sc	Gr*	We			X
Artemisia sp. (unidentified)	A sage (unidentified)	Asteraceae		Y		De		Gr				
Asclepias incarnata L.	Swamp milkweed	Asclepiadaceae		Y					We			

Scientific name	Common name	Family	Location		Habitat					Phenology		
			WMA	PFRA	Co	De	Sc	Gr	We	June	July	Aug.
Asclepias ovalifolia Dcne.	Dwarf milkweed	Asclepiadaceae	Y					Gr		X		
Asclepias sp. 1 (unidentified)	A milkweed (unidentified)	Asclepiadaceae	Y	Y		De		Gr	We		X	
Asclepias sp. 2 (unidentified) (large follicle)	A milkweed (unidentified)	Asclepiadaceae		Y				Gr				
Aster ciliolatus Lindl.	Lindley's aster	Asteraceae	Y	Y		De*	Sc	Gr*			X	X
Aster ericoides L.	Heath aster	Asteraceae	Y	Y				Gr*	We		X	X
Aster laevis L.	Smooth aster	Asteraceae	Y	Y		De	Sc	Gr*	We		X	X
Aster lateriflorus (L.) Britt.	Wood aster	Asteraceae	Y	Y				Gr				X
Aster novae-angliae L.	New England aster	Asteraceae	Y	Y				Gr				X
Aster ptarmicoides (Nees) Torr. & Gray	White upland aster	Asteraceae	Y	Y				Gr*			X	X
Aster simplex Willd.	Small blue aster	Asteraceae	Y	Y				Gr	We			X
Aster spp. (unidentified)	An aster (unidentified)	Asteraceae		Y		De		Gr				
Aster umbellatus P. Mill.	Flat-topped white aster	Asteraceae	Y					Gr				X
Astragalus adsurgens Pallas	Ascending milkvetch	Fabaceae	Y					Gr				
Astragalus canadensis L.	Canadian milkvetch	Fabaceae		Y				Gr			X	
Astragalus crassicarpus Nutt.	Ground-plum	Fabaceae	Y					Gr*		Fr		
Astragalus sp. 1 (unidentified)	A milkvetch (unidentified)	Fabaceae	Y				Sc	Gr*		X, Fr		
Astragalus sp. 2 (unidentified)	A milkvetch (unidentified)	Fabaceae		Y		De		Gr				
Avena fatua L.*	Wild oats	Poaceae		Y				Gr				
Beckmannia syzigachne (Steud.) Fern.	Slough grass	Poaceae	Y	Y				Gr			X	
Betula glandulosa Michx.	Dwarf birch	Betulaceae	Y			De						
Betula papyrifera Marsh.	White birch	Betulaceae	Y		Co							
Betula pumila L. var. *glandulifera* Regel	Swamp birch	Betulaceae	Y			De						
Betula sp. (unidentified)	A birch (unidentified)	Betulaceae	Y	Y		De						
Bidens vulgata Greene	Stick-tight	Asteraceae		Y					We			X
Botrychium virginianum (L.) Sw.	Rattlesnake fern	Ophioglossaceae	Y		Co	De		Gr				
Bouteloua gracilis (Willd. ex Kunth) Lag. *ex* Griffiths	Blue grama	Poaceae	Y					Gr*				

Scientific name	Common name	Family	Location		Habitat					Phenology		
			WMA	PFRA	Co	De	Sc	Gr	We	June	July	Aug.
Brassica kaber D. C. Wheeler *	Charlock	Brassicaceae		Y				Gr				
Bromus ciliatus L.	Fringed brome	Poaceae	Y	Y		De		Gr		X		
Bromus inermis Leyss. *	Smooth brome	Poaceae	Y	Y		De		Gr				
Bromus porteri (Coult.) Nash	Porter's chess	Poaceae	Y	Y			Sc	Gr*				
Bromus sp. (unidentified)	A brome (unidentified)	Poaceae		Y				Gr				
Calamagrostis canadensis (Michx.) Beauv.	Marsh reed grass	Poaceae	Y	Y				Gr	We			
Calamagrostis inexpansa Gray	Northern reed grass	Poaceae		Y				Gr			X	
Calamagrostis neglecta (Ehrh.) Gaertn., B. Mey. & Scherb.	Reed grass	Poaceae		Y				Gr	We		X	
Calamagrostis sp. (unidentified)	A reed grass (unidentified)	Poaceae	Y	Y				Gr	We			
Campanula aparinoides Pursh	Marsh bellflower	Campanulaceae		Y					We			
Campanula rotundifolia L.	Harebell	Campanulaceae	Y	Y			Sc	Gr*		X	X	X
Carex rostrata Stokes	Beaked sedge	Cyperaceae		Y					We			
Carex aquatilis Wahlenb.	Water sedge	Cyperaceae		Y					We			
Carex atherodes Spreng.	Awned sedge	Cyperaceae		Y					We			
Carex aurea Nutt.	Golden sedge	Cyperaceae		Y				Gr	We			
Carex disperma Dewey	Two-seeded sedge	Cyperaceae	Y		Co							
Carex granularis Muhl. *ex* Willd.	Granular sedge	Cyperaceae		Y					We			
Carex lanuginosa Michx.	Woolly sedge	Cyperaceae	Y	Y				Gr	We			
Carex lasiocarpa Ehrh.	Hairy-fruited sedge	Cyperaceae	Y						We			
Carex sp. 1 (unidentified)	A sedge (unidentified)	Cyperaceae	Y		Co	De*						
Carex sp. 2 (large) (unidentified)	A sedge (unidentified)	Cyperaceae	Y		Co				We			
Carex spp. (unidentified)	A sedge (unidentified)	Cyperaceae	Y	Y	Co	De		Gr*	We			
Carex tenera Dewey	A sedge	Cyperaceae	Y						We			
Carex tetanica Schkuhr	Rigid sedge	Cyperaceae	Y						We			
Carex viridula Michx.	Green sedge	Cyperaceae		Y				Gr				
Castilleja miniata Dougl. *ex* Hook.	Red painted-cup	Scrophulariaceae	Y	Y		De		Gr		X	X	
Cerastium arvense L.	Field chickweed	Caryophyllaceae	Y	Y			Sc	Gr*		X	X	
Cerastium sp. (unidentified)	A chickweed (unidentified)	Caryophyllaceae		Y		De						

Scientific name	Common name	Family	Location		Habitat					Phenology		
			WMA	PFRA	Co	De	Sc	Gr	We	June	July	Aug.
Chenopodium album L.*	Lamb's-quarters	Chenopodiaceae		Y				Gr				
Chrysopsis villosa (Pursh) Nutt.	Hairy golden-aster	Asteraceae	Y					Gr				X
Cirsium arvense (L.) Scop. *	Canada thistle	Asteraceae		Y		De		Gr		X	X	X
Cirsium flodmanii (Rydb.) Arthur	Flodman's thistle	Asteraceae		Y				Gr			X	X
Cirsium muticum Michx.	Swamp thistle	Asteraceae	Y				Sc		We			X
Cirsium vulgare (Savi) Ten. *	Bull thistle	Asteraceae		Y				Gr	We			
Coeloglossum viride (L.) Hartman	Frog-orchis	Orchidaceae	Y		Co	De	Sc			X	X	
Comandra umbellata (L.) Nutt.	Bastard toadflax	Santalaceae	Y	Y		De*	Sc	Gr*	We	X, Fr		
Convolvulus sepium L.	Hedge bindweed	Convolvulaceae		Y				Gr				X
Cornus canadensis L.	Bunchberry	Cornaceae	Y	Y	Co	De				X		Fr
Cornus stolonifera Michx.	Red-osier dogwood	Cornaceae	Y	Y	Co	De		Gr		X	X, Fr	X
Corylus americana Walt.	American hazelnut	Betulaceae	Y	Y		De*						Fr
Corylus cornuta Marsh.	Beaked hazelnut	Betulaceae		Y		De						
Corylus sp. (unidentified)	A hazelnut (unidentified)	Betulaceae	Y			De	Sc			Fr	Fr	
Crataegus rotundifolia Moench.	Round-leaved hawthorn	Rosaceae	Y	Y		De		Gr				Fr
Cypripedium calceolus L.	Yellow lady's-slipper	Orchidaceae	Y	Y		De		Gr		X		
Cypripedium reginae Walt.	Showy lady's-slipper	Orchidaceae	Y		Co	De					X	
Dalea candida Willd.	White prairie-clover	Fabaceae	Y	Y				Gr			X	X
Dalea purpurea Vent.	Purple prairie-clover	Fabaceae	Y	Y			Sc	Gr*			X	X
Danthonia spicata (L.) Beauv. *ex* Roemer & J. A. Schultes	Poverty oat grass	Poaceae	Y	Y				Gr*		X		
Deschampsia caespitosa (L.) Beauv.	Tufted hair grass	Poaceae	Y	Y					We	X		
Dracocephalum parviflorum Nutt.	American dragon head	Lamiaceae	Y			De*						
Drosera rotundifolia L.	Round-leaved sundew	Droseraceae	Y		Co						X	
Echinochloa crus-galli (L.) Beauv.*	Barnyard grass	Poaceae		Y				Gr				Fr
Elaeagnus commutata Bernh. *ex* Rydb.	Wolf-willow	Elaeagnaceae		Y		De				X		
Eleocharis sp.	spike-rush	Cyperaceae		Y				Gr				
Elymus canadensis L.	Canada wild rye	Poaceae	Y	Y		De						
Elymus sp. (unidentified)	A wild rye (unidentified)	Poaceae		Y				Gr				
Epilobium angustifolium L.	Fireweed	Onagraceae	Y	Y	Co	De		Gr				X

Scientific name	Common name	Family	Location		Habitat					Phenology		
			WMA	PFRA	Co	De	Sc	Gr	We	June	July	Aug.
Equisetum arvense L.	Common horsetail	Equisetaceae	Y			De						
Equisetum fluviatile L.	Swamp horsetail	Equisetaceae	Y		Co							
Equisetum hyemale L.	Common scouring-rush	Equisetaceae	Y						We			
Equisetum scirpoides Michx.	Dwarf scouring-rush	Equisetaceae	Y		Co							
Equisetum sp. (unidentified)	A scouring-rush (unidentified)	Equisetaceae	Y	Y	Co	De		Gr	We			
Erigeron acris L.	Northern daisy fleabane	Asteraceae		Y				Gr			X	
Erigeron asper Nutt.	Rough fleabane	Asteraceae	Y					Gr				
Erigeron glabellus Nutt.	Smooth fleabane	Asteraceae	Y	Y				Gr*			X	
Erigeron philadelphicus L.	Philadelphia fleabane	Asteraceae		Y		De						
Erigeron sp. (unidentified)	A fleabane (unidentified)	Asteraceae	Y	Y		De	Sc	Gr		X	X	X
Erigeron strigosus Muhl. *ex* Willd.	Daisy fleabane	Asteraceae	Y	Y				Gr				
Eriophorum angustifolium Honckeny	Tall cotton-grass	Cyperaceae	Y						We	X		
Erysimum asperum (Nutt.) DC.	Western wallflower	Brassicaceae	Y					Gr			X	
Erysimum cheiranthoides L.*	Wormseed mustard	Brassicaceae	Y					Gr		X		
Erysimum inconspicuum (S. Wats.) MacM.	Small-flowered prairie rocket	Brassicaceae	Y					Gr				
Festuca elatior L.*	Meadow fescue	Poaceae	Y					Gr				
Festuca hallii (Vasey) Piper	Plains rough fescue	Poaceae	Y					Gr				
Fragaria virginiana Duchesne	Smooth wild strawberry	Rosaceae	Y	Y	Co	De*	Sc	Gr	We	X	X	
Fraxinus pennsylvanica Marsh.	Green ash	Oleaceae	Y			De						
Gaillardia aristata Pursh	Great-flowered gaillardia	Asteraceae	Y					Gr		X	X	
Galium boreale L.	Northern bedstraw	Rubiaceae	Y	Y	Co	De*	Sc	Gr*		X	X	X
Galium trifidum L.	Small bedstraw	Rubiaceae		Y					We			
Galium triflorum Michx.	Sweet-scented bedstraw	Rubiaceae	Y	Y	Co	De				X		
Gentiana affinis Griseb.	Oblong-leaved gentian	Gentianaceae		Y				Gr			X	
Gentiana andrewsii Griseb.	Closed gentian	Gentianaceae	Y	Y				Gr				
Gentianella amarella (L.) Boerner	Felwort	Gentianaceae		Y				Gr				X
Gentianella crinita (Froel) Don.	Fringed gentian	Gentianaceae		Y				Gr				X
Geranium bicknellii Britt.	Bicknell's geranium	Geraniaceae	Y	Y		De*					X	

Scientific name	Common name	Family	Location		Habitat					Phenology		
			WMA	PFRA	Co	De	Sc	Gr	We	June	July	Aug.
Geum aleppicum Jacq.	Yellow avens	Rosaceae		Y		De						
Geum triflorum Pursh	Three-flowered avens	Rosaceae	Y				Sc	Gr*		X, Fr		
Glyceria striata (Lam.) A. S. Hitchc.	Fowl manna grass	Poaceae	Y	Y				Gr	We	X		
Glycyrrhiza lepidota Pursh	Wild licorice	Fabaceae		Y		De		Gr			X	
Grindelia squarrosa (Pursh) Dunal	Curly-cup gumweed	Asteraceae		Y				Gr			X	X
Halenia deflexa (Sm.) Griseb.	Spurred gentian	Gentianaceae	Y		Co						X	
Helianthus laetiflorus Pers.	Beautiful sunflower	Asteraceae	Y	Y			Sc	Gr*	We	X	X	X
Helianthus maximiliani Schrad.	Narrow-leaved sunflower	Asteraceae		Y				Gr				X
Helictotrichon hookeri (Scribn.) Henr.	Hooker's oat-grass	Poaceae	Y	Y				Gr*		X		
Heuchera richardsonii R. Br.	Alum root	Saxifragaceae	Y	Y		De	Sc	Gr*		X	X	
Hieracium canadense Michx.	Canada hawkweed	Asteraceae		Y		De		Gr			X	X
Hieracium sp. (unidentified)	A hawkweed (unidentified)	Asteraceae		Y				Gr				
Hierochlöe odorata (L.) Beauv.	Sweet grass	Poaceae	Y	Y				Gr		X		
Hordeum jubatum L.	Foxtail barley	Poaceae		Y				Gr	We			
Houstonia longifolia Gaertn.	Long-leaved bluets	Rubiaceae	Y					Gr		X	X	
Hypoxis hirsuta (L.) Coville	Yellow stargrass	Liliaceae	Y	Y				Gr	We	X	X	
Juncus balticus Willd.	Baltic rush	Juncaceae	Y	Y		De		Gr	We			
Juncus bufonius L.	Toad rush	Juncaceae		Y				Gr				
Juncus dudleyi Wieg.	Dudley's rush	Juncaceae	Y					Gr				
Juncus filiformis L.	Thread rush	Juncaceae	Y						We			
Juncus longistylis Torr.	Long-styled rush	Juncaceae		Y				Gr				
Juncus nodosus L.	Knotted rush	Juncaceae		Y				Gr				
Juncus sp. (unidentified)	A rush (unidentified)	Juncaceae		Y		De		Gr	We			
Juncus tenuis Willd.	Slender rush	Juncaceae		Y				Gr				
Koeleria cristata (L.) Pers.	June grass	Poaceae	Y				Sc	Gr*		X		
Lactuca sp.	A lettuce (unidentified)	Asteraceae		Y		De		Gr				
Lactuca tatarica (L.) C. A. Mey.	Wild lettuce	Asteraceae		Y				Gr			X	X
Larix laricina (Du Roi) K. Koch	Tamarack	Pinaceae	Y		Co							
Lathyrus ochreleucus Hook.	Pale vetchling	Fabaceae	Y			De*				X, Fr		

Scientific name	Common name	Family	Location		Habitat					Phenology		
			WMA	PFRA	Co	De	Sc	Gr	We	June	July	Aug.
Lathyrus palustris L.	Marsh vetchling	Fabaceae	Y						We			
Lathyrus sp. (unidentified)	A vetchling (unidentified)	Fabaceae	Y	Y		De	Sc	Gr*				
Lathyrus tuberosus L.*	Tuberous vetchling	Fabaceae		Y		De						
Lathyrus venosus Muhl. *ex* Willd.	Wild peavine	Fabaceae	Y			De				X	X	
Ledum groenlandicum Oeder.	Labrador-tea	Ericaceae	Y		Co					X	Fr	
Lepidium densiflorum Schrad.	Common pepper-grass	Brassicaceae		Y				Gr				
Liatris ligulistylis (A. Nels.) K. Schum	Meadow blazingstar	Asteraceae	Y	Y				Gr			X	X
Liatris punctata Hook.	Dotted blazingstar	Asteraceae	Y					Gr				X
Lilium philadelphicum var. *andinum* (Nutt.) Ker-Gawl	Wood lily	Liliaceae	Y	Y				Gr		X	X	X
Linnaea borealis L.	Twinflower	Caprifoliaceae	Y		Co						X	
Linum perenne L.	Perennial flax	Linaceae	Y					Gr		X	X	X
Lithospermum canescens (Michx.) Lehm.	Hoary puccoon	Boraginaceae	Y	Y		De*	Sc	Gr*		X		
Lobelia kalmii L.	Kalm's lobelia	Campanulaceae	Y	Y				Gr	We		X	
Lobelia spicata Lam.	Pale-spike lobelia	Campanulaceae	Y	Y				Gr			X	X
Lonicera dioica L.	Twining honeysuckle	Caprifoliaceae	Y	Y		De*				X		Fr
Lonicera involucrata Banks *ex* Spreng.	Black twinberry	Caprifoliaceae	Y		Co					X		
Lonicera oblongifolia (Goldie) Hook.	Swamp-fly-honeysuckle	Caprifoliaceae	Y		Co	De						
Lonicera sp. (unidentified)	A honeysuckle (unidentified)	Caprifoliaceae	Y			De						
Lotus corniculatus L.*	Bird's-foot trefoil	Fabaceae		Y				Gr				X
Lychnis alba P. Mill. *	White cockle	Caryophyllaceae	Y			De					X	
Lycopus asper Greene	Western water-horehound	Lamiaceae	Y	Y		De*		Gr	We		X	X
Lysimachia ciliata L.	Fringed loosestrife	Primulaceae	Y	Y		De		Gr	We	X	X	X
Lysimachia thyrsiflora L.	Tufted loosestrife	Primulaceae	Y	Y	Co				We		X	
Maianthemum canadense Desf.	Two-leaved Solomon's seal	Liliaceae	Y	Y		De*	Sc	Gr		X		
Matricaria matricarioides (Less.) Porter *	Pineapple weed	Asteraceae		Y				Gr				X
Medicago lupulina L.*	Black medick	Fabaceae		Y		De		Gr		X	X	X

Scientific name	Common name	Family	Location		Habitat					Phenology		
			WMA	PFRA	Co	De	Sc	Gr	We	June	July	Aug.
Medicago sativa L.*	Alfalfa	Fabaceae		Y				Gr				X
Melilotus alba Desr. *	White sweet clover	Fabaceae	Y	Y		De		Gr*		X	X	X
Melilotus officinalis (L.) Lam. *	Yellow sweet clover	Fabaceae	Y	Y		De	Sc	Gr		X	X	X
Mentha arvensis L.	Common mint	Lamiaceae	Y	Y		De		Gr	We		X	X
Menyanthes trifoliata L.	Bogbean	Menyanthacaeae	Y		Co							
Mitella nuda L.	Mitrewort	Saxifragaceae	Y		Co	De				X		
Monarda fistulosa L.	Wild bergamot	Lamiaceae						Gr			X	X
Monotropa uniflora Linnaeus	Indian-pipe	Monotropaceae	Y			De						X
Muhlenbergia asperifolia (Nees & Meyen *ex* Trin.) Parodi	Scratch grass	Poaceae	Y	Y				Gr				
Muhlenbergia cuspidata (Torr. *ex* Hook) Rydb.	Prairie muhly	Poaceae	Y					Gr				
Muhlenbergia glomerata (Willd.) Trin.	Bog muhly	Poaceae	Y	Y				Gr*				
Muhlenbergia racemosa (Michx.) B. S. P.	Marsh muhly	Poaceae	Y					Gr				
Muhlenbergia richardsonis (Trin.) Rydb.	Mat muhly	Poaceae		Y				Gr				
Oenothera biennis L.	Evening-primrose	Onagraceae	Y	Y				Gr*		X	X	
Orchis rotundifolia Banks *ex* Pursh	Small round-leaved orchis	Orchidaceae	Y		Co					X		
Orobanche fasciculata Nutt.	Clustered broom-rape	Orobanchaceae	Y					Gr		X		
Orthocarpus luteus Nutt.	Owl's-clover	Scrophulariaceae	Y	Y				Gr			X	X
Oryzopsis asperifolia Michx.	White-grained mountain rice grass	Poaceae	Y	Y		De*	Sc					
Oxytropis campestris (L.) DC.	Late yellow locoweed	Fabaceae	Y					Gr		X		
Oxytropis lambertii Pursh	Purple locoweed	Fabaceae	Y					Gr				
Oxytropis sp. (unidentified)	A locoweed (unidentified)	Fabaceae	Y					Gr*		X		
Panicum capillare L.	Witch grass	Poaceae	Y	Y				Gr				
Panicum lanuginosum Ell.	Soft millet	Poaceae	Y	Y				Gr				
Panicum liebergii (Vasey) Scribn.	Lieberg's panic grass	Poaceae	Y						We	X		
Panicum sp. (unidentified)	A millet (unidentified)	Poaceae	Y					Gr				

Scientific name	Common name	Family	Location		Habitat					Phenology		
			WMA	PFRA	Co	De	Sc	Gr	We	June	July	Aug.
Panicum virgatum L.	Switch grass	Poaceae	Y						We			
Parnassia sp. (unidentified)	A grass-of-parnassus (unidentified)	Saxifragaceae	Y	Y	Co			Gr				X
Pedicularis canadensis L.	Wood-betony	Scrophulariaceae	Y	Y			Sc	Gr	We	X		
Pedicularis lanceolata Michx.	Swamp lousewort	Scrophulariaceae	Y						We		X	
Penstemon gracilis Nutt.	Lilac-flowered beard-tongue	Scrophulariaceae	Y	Y				Gr*		X	X	
Petasites sagitattus (Banks *ex* Pursh) Gray	Arrow-leaved colt's-foot	Asteraceae	Y	Y	Co	De		Gr		X		
Petasites x vitifolius Greene (pro sp.)	Vine-leaved colt's-foot	Asteraceae	Y						We			
Phalaris arundinacea L.	Reed canary grass	Poaceae	Y	Y				Gr	We	X		
Phleum pratense L.*	Common timothy	Poaceae	Y	Y		De		Gr			X	
Phragmites australis (Cav.) Trin. *ex* Steud.	Common reed	Poaceae	Y						We			X
Physostegia virginiana (L.) Benth.	False dragonhead	Lamiaceae		Y				Gr			X	X
Picea glauca (Moench) Voss	White spruce	Pinaceae	Y		Co							
Picea mariana (P. Mill.) B. S. P.	Black spruce	Pinaceae	Y		Co							
Pinus banksiana Lamb	Jack pine	Pinaceae	Y			De						
Plantago major L.*	Common plantain	Plantaginaceae	Y	Y		De	Sc	Gr			X	X
Platanthera hyperborea (L.) Lindl.	Bog orchis	Orchidaceae	Y		Co						X	
Platanthera obtusata (Banks *ex* Pursh) Lindl.	Small northern bog orchid	Orchidaceae	Y		Co						X	
Poa compressa L.*	Canada blue grass	Poaceae	Y	Y				Gr				
Poa nemoralis L.	Wood blue grass	Poaceae	Y					Gr				
Poa palustris L.	Fowl blue grass	Poaceae	Y	Y		De		Gr	We			
Poa pratensis L.	Kentucky blue grass	Poaceae	Y	Y		De		Gr*	We			
Poa sp. (unidentified)	A blue grass (unidentified)	Poaceae	Y	Y		De	Sc	Gr	We			
Polygala paucifolia Willd.	Fringed polygala	Polygalaceae	Y		Co					X		
Polygala senega L.	Seneca snakeroot	Polygalaceae	Y	Y		De*		Gr		X	X	
Polygonum amphibium L. var. *emersum* Michx.	Water smartweed	Polygonaceae	Y	Y					We		X	

Scientific name	Common name	Family	Location		Habitat					Phenology		
			WMA	PFRA	Co	De	Sc	Gr	We	June	July	Aug.
Polygonum convolvulus L.*	Black bindweed	Polygonaceae	Y					Gr*			X	
Polygonum lapathifolium L.	Pale smartweed	Polygonaceae		Y				Gr				X
Polygonum ramosissimum Michx.	Bushy knotweed	Polygonaceae		Y				Gr				
Polygonum sp. (unidentified)	A knotweed (unidentified)	Polygonaceae	Y	Y					We			
Populus balsamifera L.	Balsam poplar	Salicaceae	Y	Y		De			We			
Populus tremuloides Michx.	Trembling aspen	Salicaceae	Y	Y	Co	De*	Sc					
Potamogeton sp. (unidentified)	A pondweed (unidentified)	Potamogetonaceae	Y						We			
Potentilla anserina L.	Silverweed	Rosaceae	Y	Y				Gr	We	X	X	X
Potentilla argentea L.*	Silvery cinquefoil	Rosaceae	Y			De	Sc	Gr*		X		
Potentilla arguta Pursh	Tall cinquefoil	Rosaceae	Y	Y				Gr*		X		
Potentilla fruticosa (Pursh) A. Love	Shrubby cinquefoil	Rosaceae	Y	Y	Co	De		Gr	We	X	X	X
Potentilla sp. (unidentified)	A cinquefoil (unidentified)	Rosaceae	Y					Gr				
Prenanthes alba L.	White lettuce	Asteraceae	Y	Y				Gr				X
Prunella vulgaris L.*	Heal-all	Lamiaceae		Y				Gr	We		X	
Prunus pumila L.	Sand cherry	Rosaceae	Y					Gr*				
Prunus virginiana L.	Choke cherry	Rosaceae	Y	Y	Co	De*	Sc	Gr		X	Fr	
Psoralea esculenta Nutt.	Indian breadroot	Fabaceae	Y				Sc	Gr*		X		
Pyrola asarifolia Michx.	Pink pyrola	Pyrolaceae	Y		Co	De					X	
Pyrola sp. (unidentified)	A pyrola (unidentified)	Pyrolaceae	Y	Y	Co	De						
Pyrola virens Schweigg.	Greenish-flowered wintergreen	Pyrolaceae	Y	Y		De				X		
Quercus macrocarpa Michx.	Bur oak	Fagaceae	Y	Y		De*	Sc					Fr
Ranunculus cymbalaria Pursh	Seaside crowfoot	Ranunculaceae		Y				Gr				X
Ranunculus sp. (unidentified)	A buttercup (unidentified)	Ranunculaceae	Y	Y		De	Sc	Gr	We			
Rhamnus alnifolia L'Her.	Alder-leaved buckthorn	Rhamnaceae	Y		Co	De						Fr
Rhus radicans L.	Poison-ivy	Anacardiaceae	Y	Y		De*	Sc	Gr		X		
Ribes hirtellum Michx.	Smooth gooseberry	Grossulariaceae	Y			De						
Ribes sp. (unidentified)	A currant (unidentified)	Grossulariaceae		Y		De						
Ribes triste Pallas	Wild red currant	Grossulariaceae	Y			De						
Rorippa sp. (unidentified) *	A cress (unidentified)	Brassicaeae		Y					We			

Scientific name	Common name	Family	Location		Habitat					Phenology		
			WMA	PFRA	Co	De	Sc	Gr	We	June	July	Aug.
Rosa sp. (unidentified)	A rose (unidentified)	Rosaceae	Y	Y		De	Sc	Gr*	We	X	X	X, Fr
Rubus idaeus L.	Wild red raspberry	Rosaceae	Y	Y		De						
Rubus pubescens Raf.	Dewberry	Rosaceae	Y	Y	Co	De					X, Fr	
Rudbeckia hirta L.	Black-eyed Susan	Asteraceae	Y	Y		De	Sc	Gr	We	X	X	X
Rumex crispus L.*	Curled dock	Polygonaceae		Y				Gr				
Sagittaria cuneata Sheldon	Arum-leaved arrowhead	Alismataceae		Y					We		X	
Salix lutea Nutt.	Yellow willow	Salicaceae		Y		De						
Salix candida Fluegge *ex* Willd.	Hoary willow	Salicaceae	Y		Co							
Salix exigua Nutt.	Sandbar willow	Salicaceae	Y	Y		De			We			
Salix sp. (unidentified)	A willow (unidentified)	Salicaceae	Y	Y		De*	Sc					
Sanicula marilandica L.	Snakeroot	Apiaceae	Y	Y	Co	De	Sc	Gr		X	X, Fr	
Sarracenia purpurea L.	Pitcher plant	Sarraceniaceae	Y		Co						X	
Schizachne purpurascens (Torr.) Swallen	Purple oat grass	Poaceae	Y	Y		De	Sc			X		
Scirpus tabernaemontani K.C. Gmel.	Soft-stem bulrush	Cyperaceae		Y					We			
Scirpus pallidus (Britt.) Fern.	Green bulrush	Cyperaceae	Y					Gr				
Scirpus sp. (unidentified)	A bulrush (unidentified)	Cyperaceae	Y						We			
Scirpus sp. (small) (unidentified)	A bulrush (unidentified)	Cyperaceae		Y					We			
Scutellaria epilobifolia A. Hamilton	Common skullcap	Lamiaceae	Y	Y					We		X	
Secale cereale L.*	Rye	Poaceae	Y					Gr		X		
Senecio canus Hook.	Silvery groundsel	Asteraceae	Y					Gr		X		
Senecio sp. (unidentified)	A ragwort	Asteraceae	Y					Gr		X		
Shepherdia canadensis L. (Nutt.)	Canada buffaloberry	Elaeagnaceae	Y	Y		De						
Silene sp. (unidentified)	A catchfly (unidentified)	Caryophyllaceae	Y					Gr				
Sisyrinchium montanum Greene	Common blue-eyed grass	Iridaceae	Y	Y		De	Sc	Gr*		X, Fr	X	
Sium suave Walt.	Water-parsnip	Apiaceae	Y	Y				Gr	We		X	X
Smilacina stellata (L.) Desf.	Star-flowered Solomon's seal	Liliaceae	Y	Y	Co	De	Sc	Gr	We	X		Fr
Smilacina trifolia (L.) Desf.	Three-leaved Solomon's seal	Liliaceae	Y		Co						X	

Scientific name	Common name	Family	Location		Habitat					Phenology		
			WMA	PFRA	Co	De	Sc	Gr	We	June	July	Aug.
Smilax lasioneura Hook.	Carrion-flower	Smilacaceae	Y	Y		De*	Sc	Gr		X		Fr
Solidago canadensis L.	Canada goldenrod	Asteraceae		Y				Gr			X	
Solidago gigantea Ait.	Late goldenrod	Asteraceae		Y				Gr				
Solidago graminifolia (L.) Salisb.	Flat-topped goldenrod	Asteraceae	Y	Y				Gr	We		X	X
Solidago hispida Muhl. *ex* Willd.	Hairy goldenrod	Asteraceae	Y	Y		De		Gr			X	X
Solidago missouriensis Nutt.	Low goldenrod	Asteraceae	Y	Y				Gr			X	X
Solidago nemoralis Ait.	Showy goldenrod	Asteraceae	Y					Gr				X
Solidago rigida L.	Stiff goldenrod	Asteraceae	Y	Y		De		Gr*	We			X
Solidago sp. (unidentified)	A goldenrod (unidentified)	Asteraceae	Y	Y	Co	De	Sc	Gr*	We			
Sonchus arvensis L.*	Field sow-thistle	Asteraceae		Y				Gr			X	X
Sonchus sp. (unidentified) *	A sow thistle (unidentified)	Asteraceae	Y	Y		De		Gr	We			X
Spartina pectinata Link	Slough grass	Poaceae	Y	Y				Gr	We			
Sphenopholis intermedia (Rydb.) Rydb.	Slender wedge grass	Poaceae		Y				Gr				
Spiranthes romanzoffiana Cham.	Hooded ladies'-tresses	Orchidaceae		Y				Gr				
Spiraea alba Du Roi	Meadowsweet	Rosaceae	Y	Y		De		Gr	We		X	X
Sporobolus heterolepis (Gray) Gray	Prairie dropseed	Poaceae	Y	Y				Gr*				
Stachys palustris L.	Woundwort	Lamiaceae	Y	Y				Gr	We		X	X
Stipa sp. (unidentified)	A spear grass (unidentified)	Poaceae	Y				Sc	Gr*				
Stipa spartea Trin.	Porcupine grass	Poaceae	Y					Gr		X		
Symphoricarpos occidentalis Hook.	Western snowberry	Caprifoliaceae	Y	Y		De		Gr			X	
Symphoricarpos sp.	A snowberry (unidentified)	Caprifoliaceae	Y	Y		De*	Sc	Gr			X	
Taraxacum officinale G. H. Weber *ex* Wiggers	Common dandelion	Asteraceae	Y	Y		De*		Gr	We	X, Fr	X	X
Thalictrum dasycarpum Fish. & Ave-Lall.	Tall meadow-rue	Ranunculaceae	Y					Gr		X		
Thalictrum sp. (unidentified)	A meadow-rue	Ranunculaceae	Y	Y		De*	Sc	Gr	We	X	X	

Scientific name	Common name	Family	Location		Habitat					Phenology		
			WMA	PFRA	Co	De	Sc	Gr	We	June	July	Aug.
	(unidentified)											
Thalictrum venulosum Trel.	Veiny meadow-rue	Ranunculaceae	Y			De						
Tofieldia glutinosa (Michx.) Pers.	Sticky asphodel	Liliaceae		Y				Gr			X	
Tragopogon sp. (unidentified) *	Goat's-beard	Asteraceae	Y					Gr		X		
Trientalis borealis Raf.	Northern starflower	Primulaceae	Y		Co					X		
Trifolium hybridum L.*	Alsike clover	Fabaceae		Y				Gr		X	X	
Trifolium pratense L.*	Red clover	Fabaceae	Y	Y				Gr				X
Trifolium repens L.*	White clover	Fabaceae		Y				Gr			X	X
Trifolium sp.(unidentified) *	A clover (unidentified)	Fabaceae		Y		De		Gr				
Triglochin maritima L.	Seaside arrow-grass	Juncaginaceae	Y	Y				Gr	We	X	X	Fr
Typha sp. (unidentified)	A cat-tail (unidentified)	Typhaceae		Y					We			
Ulmus americana L.	American elm	Ulmaceae	Y			De						
Utricularia vulgaris L.	Greater bladderwort	Lentibulariaceae	Y	Y					We	X		
Vaccinium oxycoccos L.	Small cranberry	Ericaceae	Y		Co					X		
Valeriana dioica L.	Northern valerian	Valerianaceae	Y			De				X		
Viburnum lentago L.	Nannyberry	Caprifoliaceae		Y		De						
Viburnum opulus L.	Highbush-cranberry	Caprifoliaceae	Y	Y	Co	De				X		
Viburnum rafinesquianum J. A. Schultes	Downy arrow-wood	Caprifoliaceae	Y	Y		De				X		
Vicia americana Muhl. *ex* Willd.	Common vetch	Fabaceae	Y	Y		De*	Sc	Gr	We	X	X	X
Viola adunca Sm.	Early blue violet	Violaceae	Y	Y				Gr*				X
Viola nephrophylla Greene	Northern bog violet	Violaceae	Y		Co							
Viola pedatifida G. Don.	Purple prairie violet	Violaceae	Y					Gr		X		
Viola renifolia Gray	Kidney-shaped violet	Violaceae		Y		De						
Viola sp. (unidentified)	A violet (unidentified)	Violaceae	Y	Y	Co	De	Sc	Gr		X		
Zigadenus elegans Pursh	White camas	Liliaceae	Y	Y				Gr			X	
Zizia aptera (Gray) Fern	Heart-leaved alexanders	Apiaceae	Y	Y		De	Sc	Gr*		X		
Zizia aurea (L.) W. D. J. Koch	Golden alexanders	Apiaceae	Y	Y		De		Gr		X	X, Fr	

Appendix XIV

Animal species including common and scientific names, study area(s) and habitat type(s) recorded for Alonsa Wildlife Management Area and Alonsa Community Pasture

De = species recorded in Deciduous woodland (Aspen woodland)
Gr = species recorded in Grassland (* indicates recorded in burned grassland)
We = species recorded in Wetland

Species		Alonsa WMA			Alonsa Community Pasture		
Common name	**Scientific name**	**Woodland**	**Grassland**	**Wetland**	**Woodland**	**Grassland**	**Wetland**
Birds							
Alder flycatcher	*Empidonax alnorum*				De		We
American bittern	*Botaurus lentiginosus*						We
American coot	*Fulica americana*			We			
American crow	*Corvus brachyrhynchos*	De	Gr	We	De	Gr	We
American goldfinch	*Carduelis tristis*	De	Gr	We	De	Gr	We
American kestrel	*Falco sparverius*		Gr	We		Gr	We
American redstart	*Setophaga ruticilla*	De			De		
American robin	*Turdus magratorius*	De	Gr		De	Gr	
American white pelican	*Pelecanus erythrorhynchos*		Gr	We		Gr	We
Barn swallow	*Hirundo rustica*					Gr	We
Black tern	*Childonias niger*						We
Black-and-white warbler	*Mniotilta varia*	De					
Black-billed cuckoo	*Coccyzus erythropthalmus*			We			
Black-billed magpie	*Pica pica*		Gr			Gr	
Black-capped chickadee	*Parus atricapillus*	De			De		
Black-crowned night heron	*Nycticorax nycticorax*						We
Blue Jay	*Cyanocitta cristata*	De			De		
Blue-winged teal	*Anas discors*			We		Gr	We
Bobolink	*Dolichonyx oryzivorus*					Gr	
Brewer's blackbird	*Euphagus cyanocephalus*						We

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Broad-winged hawk	*Buteo platypterus*	De	Gr	We			
Brown creeper	*Certhia americana*	De					
Brown thrasher	*Toxostoma longirostre*	De					
Brown-headed cowbird	*Molothrus ater*					Gr	We
Canada goose	*Branta canadensis*					Gr	We
Canada warbler	*Wilsonia canadensis*			We			We
Cedar waxwing	*Bombycilla cedrorum*	De		We	De		We
Chestnut-sided warbler	*Dendroica pensylvanica*	De					
Chipping sparrow	*Spizella passerina*					Gr	
Clay-colored sparrow	*Spizella pallida*		Gr			Gr	
Common nighthawk	*Chordeiles minor*				De	Gr	
Common raven	*Corvus corax*					Gr	
Common snipe	*Gallinago gallinago*			We		Gr	We
Common yellowthroat	*Geothlypis trichas*		Gr			Gr	
Eastern bluebird	*Sialia sialis*				De	Gr	
Eastern kingbird	*Tyrannus tyrannus*	De	Gr	We	De	Gr	We
Eastern Phoebe	*Sayornis phoebe*	De		We	De		
Eastern wood-peewee	*Contopus virens*				De		
Franklin's gull	*Larus popixcan*						We
Great blue heron	*Ardea herodias*			We			We
Great-crested flycatcher	*Myiarchus crinitus*	De					
Green-winged teal	*Anas crecca*			We			We
Hairy woodpecker	*Picoides villosus*	De			De		
Horned lark	*Eremophila alpestris*				De	Gr	
Killdeer	*Charadrius vociferus*					Gr	We
Le Conte's sparrow	*Ammodramus leconteii*			We		Gr	
Least flycatcher	*Empidonax minimus*	De			De		
Mallard	*Anas platyrhynchos*			We			We
Marbled godwit	*Limosa fedoa*		Gr	We		Gr	We

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Marsh wren	*Cistothorus palustris*			We			We
Merlin	*Falco columbarius*						
Mourning dove	*Zenaida macroura*	De	Gr	We	De	Gr	We
Mourning warbler	*Oporomis philadelphia*			We			
Nashville warbler	*Vermivora ruficapilla*	De					
Northern flicker	*Colaptes auratus*	De			De		
Northern goshawk	*Accipiter gentilis*					Gr	We
Northern harrier	*Circus cyaneus*		Gr			Gr	We
Ovenbird	*Seiurus noveboracensis*	De			De		
Philadelphia vireo	*Vireo philadelphicus*	De			De		
Pied-billed grebe	*Podilymbus podiceps*			We			
Pileated woodpecker	*Dryocopus pileatus*	De					
Red-breasted nuthatch	*Sitta canadensis*	De					
Red-eyed vireo	*Vireo olivaceus*	De			De		
Red-tailed hawk	*Buteo jamaicensis*	De	Gr	We	De	Gr	We
Red-winged blackbird	*Agelaius phoeniceus*			We			We
Ring-billed gull	*Larus delawarensis*					Gr	We
Rose-breasted grosbeak	*Pheucticus ludovicianus*	De			De		
Ruby-crowned kinglet	*Regulus calendula*	De					
Ruddy duck	*Oxyura jamaicensis*			We			We
Ruffed grouse	*Bonasa umbellus*	De					
Rusty blackbird	*Euphagus carolinus*			We			
Sandhill crane	*Grus americana*		Gr			Gr	
Savannah sparrow	*Passerculus sandwichensis*		Gr			Gr	
Scarlet tanager	*Piranga olivacea*	De					
Sedge wren	*Cistothorus platensis*			We			We
Sharp-shinned hawk	*Accipiter striatus*					Gr	We
Sharp-tailed grouse	*Tympanuchus phasianellus*	De	Gr			Gr	
Solitary vireo	*Vireo solitarius*	De			De		

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Song sparrow	*Melospiza melodia*	De	Gr	We	De	Gr	We
Sora	*Porzana carolina*			We			We
Spotted sandpiper	*Actitis macularia*						We
Swainson's hawk	*Buteo swainsoni*		Gr				
Tennessee warbler	*Vermivora peregrina*	De			De		
Upland sandpiper	*Bartramia longicauda*		Gr				We
Veery	*Catharus fuscescens*	De					
Vesper sparrow	*Pooecetes gramineus*		Gr				
Virginia rail	*Rallus limicola*			We			
Warbling vireo	*Vireo gilvus*	De					
Western kingbird	*Tyrannus verticalis*		Gr	We	De	Gr	We
Western meadowlark	*Sturnella neglecta*		Gr			Gr	We
Whip-poor-will	*Caprimulgus carolinenis*	De	Gr	We	De	Gr	We
White-throated sparrow	*Zonotrichia albicollis*	De			De		
Wood thrush	*Hylocichla mustelina*	De			De		
Yellow rail	*Coturnicops noveboracensis*						We
Yellow-bellied sapsucker	*Sphyrapicus varius*	De			De		
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*			We			We
Mammals							
Coyote	*Canis latrans*	De	Gr	We	De	Gr	We
Deer mouse	*Peromyscus maniculatus*	De		We	De		
Eastern chipmunk	*Tamias striatus*	De					
Eastern cottontail	*Sylvilagus floridanus*		Gr			Gr	
Elk	*Cervus elaphus*	De					
Franklin's ground squirrel	*Spermophilus franklini*		Gr			Gr	
Least chipmunk	*Tamias minimus*			We			
Masked shrew	*Sorex cinereus*			We			
Meadow vole	*Microtus pennsylvanicus*					Gr	We

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Moose	*Alces alces*			We			
Muskrat	*Ondatra zibethicus*			We			
Southern red-backed vole	*Clethrionomys gapperi*	De		We			
Richardson's ground squirrel	*Spermophilus richardsonii*	De		We	De		
Striped skunk	*Mephitis mephitis*		Gr				
Thirteen-lined ground squirrel	*Spermophilus tridecemilineatus*	De	Gr				
White-tailed deer	*Odocoileus virginianus*	De	Gr	We	De	Gr	
White-tailed jackrabbit	*Lepus townsendii*	De	Gr				
Amphibians							
Boreal chorus frog	*Pseudacris triseriata maculata*			We			We
Gray treefrog	*Hyla versicolor*	De					
Wood frog	*Rana sylvatica*		Gr	We		Gr	We
Reptiles							
Western plains garter snake	*Thamnophis radix haydenii*		Gr	We		Gr	We
Dragonflies							
Canada darner	*Aeshna canadensis*		Gr	We		Gr	We
Dot-tailed whiteface	*Leucorrhinia intacta*		Gr				
Four-spotted skimmer	*Libellula quadrimaculata*		Gr				
Green darner	*Anax junius*		Gr				
Red-veined meadowhawk	*Sympetrum madidum*			We			
Ruby meadowhawk	*Sympetrum rubicundulum*			We			
Twelve-spotted skimmer	*Libellula pulchella*						We
Variegated meadowhawk	*Sympetrum corruptum*		Gr				
White-faced meadowhawk	*Sympetrum obtrusum*			We			

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Butterflies							
Cabbage white	*Pieris rapae*					Gr	
Common sulphur	*Colias philodice*		Gr			Gr	
Common wood nymph	*Ceryonis pegala*	De		We	De		We
Dreamy dusky wing	*Erynnis icelus*		Gr				
Gorgone checkerspot	*Chlosyne gorgone*	De					
Great spangled fritillary	*Speyeria cybele*	De		We	De		We
Monarch	*Danaus plexippus*		Gr				
Northwestern fritillary	*Speyeria electa*		Gr	We		Gr	
Peck's skipper	*Polites coras*	De					
Ringlet	*Coenonympha tullia*	De	Gr		De	Gr	
Pepper and salt skipper	*Amblyscirtes hegon*	De					
Silvery checkerspot	*Chlosyne nycteis*	De					
Tiger swallowtail	*Papilio glaucus*		Gr				
Viceroy	*Limenitis archippus*		Gr			Gr	
Western tailed blue	*Everes amyntula*		Gr				